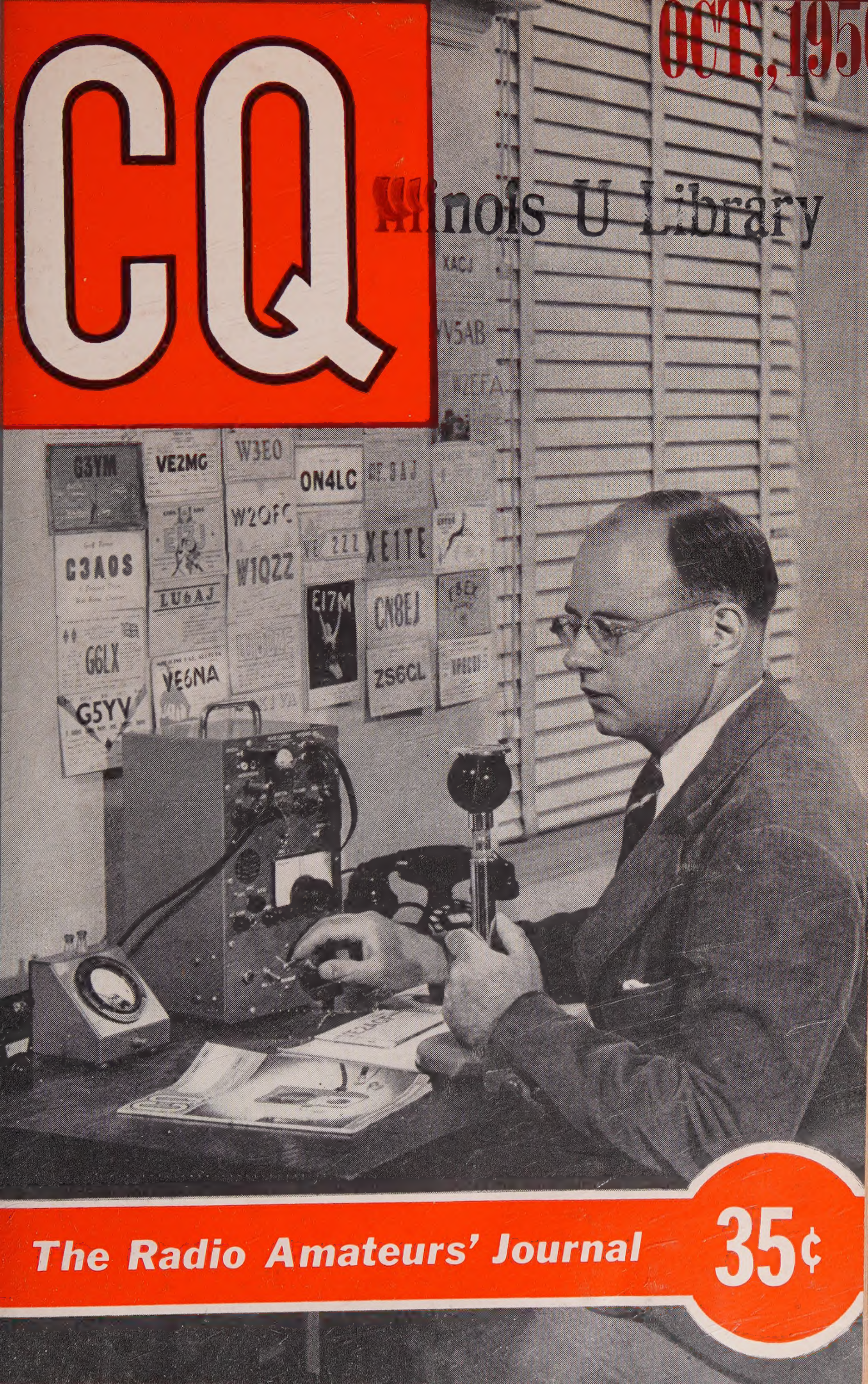
CQ

OCT., 195

Illinois U Library



The Radio Amateurs' Journal

35¢

hallicrafters

"The Radio Man's Radio"

commands the world's airwaves!

In every price range, Hallicrafters offers precision instruments—to serve you better, and giving you more value for your investment than any other set.

Model SX-62 World's finest receiver for the all-wave listener. Outperforms any broadcast receiver on any frequency—continuous coverage from 540 kc to 109 Mc in six bands. Crystal calibration oscillator built in. Six position selectivity with crystal filter. Two stages r-f, three stages i-f amplification. 10-watt push-pull high fidelity output. Phonograph jack. 14 tubes plus regulator and rectifier.............. **$269.50**

Model SX-71 Value-packed with features specifically asked for by the Hams. Extra sensitivity, selectivity, and stability; double super-heterodyne, plus built-in Narrow Band FM. One r-f, two conversion, and three i-f stages. Range 538 kc to 35 Mc, 46-55 Mc. Extra wide dials for Main and Bandspread Tuning. Sensitivity, Volume, BFO Pitch, Selectivity, and Crystal Phasing controls.; AVC, BFO, Rec./Standby, ANL, Tone, and Phono-Rec. switches. Phonograph input jack. 500, 3.2-ohm output....... **$189.50**

Model S-40B New version of an old favorite. Temperature compensated oscillator; tuned r-f stage, two i-f stages for better selectivity. Covers 540 kc to 43 Mc in four bands. Sensitivity, volume, three-position Tone, BFO Pitch, controls; AVC, BFO, Rec./Standby, and Noise Limiter Switches. Built-in PM speaker. External power, remote control connections. 7 tubes plus rect.
S-40B **$89.95**

Model S-38B Pulls in broadcast stations in weak signal areas where ordinary sets fail. Also offers world-wide reception for the short-wave listener and the new amateur. Covers Broadcast Band and three short-wave bands 540 kc to 32 Mc. Separate Fine Tuning control. BFO, Rec./Standby, Speaker/Phones switches. Built-in PM speaker. Four tubes plus rectifier. For 115 V. AC or DC....................... **$49.50**

WORLD'S LEADING MANUFACTURER OF PRECISION RADIO AND TELEVISION • CHICAGO 24, ILLINOIS

We want you to know that every effort is being made to keep our Distributors supplied. If the model you select is temporarily out of stock, please be patient—you'll find that a Precision HALLICRAFTERS is worth waiting for!

VOL. 6, NO. 10

CONTENTS

OCT. 1950

EDITORIAL STAFF

EDITOR
ALBERT E. HAYES, JR., W2BYF

•

ASSOCIATE EDITORS

Herbert Becker, W6QD,	DX
Louisa B. Sando, W7OOH,	YL
E. M. Brown, W2PAU,	VHF-UHF
Ralph Anderson, W3NL,	Mobile
Frank Y. Hayami, W2TNE,	Art

•

CONTRIBUTING EDITORS

JACK E. WILLSON, W2AQX
ROBERT C. CHEEK, W3LOE
FRANK C. JONES, W6AJF
R. LEIGH NORTON, W6CEM

•

SCIENTIFIC OBSERVATIONS

O. P. Ferrell, Project Supervisor
Radio Amateur Scientific Observations,
121 S. Broad St., Philadelphia 7, Pa.

•

BUSINESS STAFF

S. R. COWAN,	Publisher
S. L. CAHN,	Nat'l Adv. Mgr.
H. N. REIZES,	Adv. Mgr.
D. SALTMAN,	Prod. Mgr.
H. WEISNER,	Circ. Mgr.

Branch Office: J. C. Galloway, 816 W. 5th St., Los Angeles, 17, Calif. MUtual 8335.

Foreign Subscription Representatives: Radio Society of Great Britain, New Ruskin House, Little Russel St., London, WC 1, England. Technical Book & Magazine Co., 297 Swanston St., Melbourne C1, Victoria, Australia.

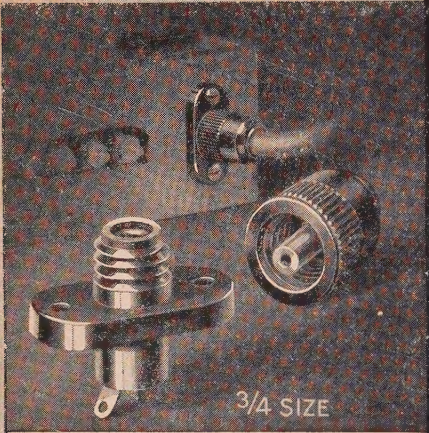
OUR COVER

That super-compact transmitter-receiver combination Tom Lott, VE2AGF, is operating is typical of the scores of entries in our "Home Brew" Contest which our judges are now scanning. Watch future issues for the announcement of the winners. (*Photo by VE2MG.*)

Letters 4
Scratchi 6
Zero Bias (*Editorial*) 9
An Advanced Amateur Receiver
R. P. Haviland, W2JDA 12
Getting the Most Out of Your Transmitter
Wilfred M. Scherer, W2AEF 19
How to Dress Up Your Station
Charles Welch, W5MHK 22
Tone Operated Keyer
F. A. Bartlett, W6OWP 25
The Contest Machine
M. E. Hiehle, W2SO 29
The Saga of FP8AC
William I. Orr, W6SAI 31
The MARS Page 33
Low Cost Modulator for the KW Final
M. H. Kronenberg, W2IJU 34
Painless Breakin Operation
Stephen Leibholz, W2ZDE 36
V.H.F.—U.H.F. 38
DX and Overseas News 40
WAZ Honor Roll 41
The YL's Frequency 44
The Monitoring Post 46
Classified Ads 70
Advertising Index 72

CQ—(Title Reg. U. S. Pat. Office)—is published monthly at 10 McGovern Ave., Lancaster, Pa., by **Cowan Publishing Corp.** Executive and Editorial offices at 342 Madison Ave., New York 17, N. Y. Phone MUrray Hill 7-6375. Entered as Second Class Matter Feb. 1, 1950 at the Post Office, Lancaster, Pa., under the Act of Mar. 3, 1879. Subscription Rates: in U. S. A. & Possessions, Canada & Pan American Union—1 year $3.00; 2 years $5.00. Elsewhere $4.00 per year. Single copies 35 cents. Printed in U. S. A. Entire contents copyright 1950 by Cowan Publishing Corp.

Designed for Application



THE NO. 37001
SAFETY TERMINAL

An old favorite in the line of exclusive Millen "Designed for Application" products. Combination high voltage terminal and thru-bushing. Tapered contact pin fits firmly into conical socket providing large area, low resistance connection. Pin is swivel mounted in cap to prevent twisting of lead wire. Easy to use. ¼" o.d. insulation high voltage cable fits into opening in cap. Bared conductor passes thru pin for easy soldering to pre-tinned tip of contact plug.

•

Standard 37001 available in either black or red bakelite. No. 37501 is low loss mica filled yellow bakelite for R.F. applications.

JAMES MILLEN
MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS

★ ★ Letters ★ ★

Operating Procedure

2509 32nd St., S.E., Washington 20, D. C.

Editor, *CQ:*

Personal opinions are all right in their place, but when such opinions are foisted on the amateur fraternity under the guise of legal interpretations, and when the inferences of such interpretations are so contrary to fact, we feel that all amtaeurs should be so advised.

In August, 1950, *QST,* there appears an article on radiotelephone operating procedure. In this article is a paragraph on portable and mobile voice procedure which not only contains some statements which are not in accordance with the FCC Regulations, but also contains some inferences which are wholly misleading.

First, the statement is made that the operator of a portable or mobile station gives his call and approximate geographical location *at the end* of each contact. (The word "approximate" does not appear in the FCC Regulations). The difficulty here is that this is the maritime-mobile regulation, and as such is not applicable either to ordinary automobile operation or to portable operation. The correct FCC regulation unequivocably states that, when operating phone, mobile or portable, the call must be followed by the geographical location, and the regulation doesn't say anything about at the end of the contact, nor does it include the call sign area number.

The examples in the article include the call sign area number in connection with the call in each instance, whereas the FCC regulations *do not require the call sign area number in any of the examples,* or for that matter *at any time* when phone is employed, whether portable or mobile. There is no accompanying statement that the call sign area number is *not* required, thus inferring that it is necessary. Yet the examples are preceded with the parenthetical term "(and legal)" implying that the examples illustrate the requirements of the FCC Regulations. As a matter of fact, it appears that the examples do not even contain the bare essentials of the FCC requirements in the manner in which the geographical location of the station is given. The name of a city or the cryptic "near" a city cannot be construed to satisfy the requirements of a location. If it did, by extension, one might as well use the term "in the United States."

We cannot possibly conceive how a mobile station in a parked car could be called a portable instead of a mobile, since there is absolutely nothing in the Regulations to warrant such a conclusion. Conversely the wording of the regulations affirms that a mobile, when parked, is still a mobile since a mobile station is ". . . ordinarily used while such mobile unit is in motion", implying that it is sometimes operated when it is not in motion. There might possibly be unusual circumstances when a mobile becomes a portable, but in no sense does a station change from a mobile to a portable just because the motion of the car has ceased.

Simple retrospection will reveal the underlying factor in the regulations governing mobile and portable or phone operating procedure. Regulations are for the protection of the amateur himself. If inter-

(*Continued on page 68*)

Standard of Excellence

PRs are on top! Wherever you go, the world around . . . wherever dependable radio frequency control is essential . . . PR Crystals stand out as the standard by which other crystals are judged. This is no accident. PR stands for superb QUALITY. Nothing is spared to make PRs truly the standard of excellence . . . and your dealer will tell you the same thing.

• 20 METERS, Type Z-3, $3.75 • 40, 80 & 160 METERS, Type Z-2, $2.75

PR Crystals

Since 1934

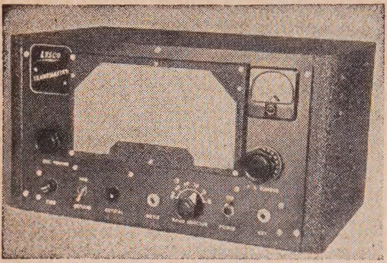
USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

LET'S GO *LYSCO*

TRANSMITTER-EXCITER
TRANSMASTER

Mod. 600—TVAreas • Mod. 500—Wide Open Spaces



FEATURES: Break-in keying, illuminated dial, PA Plate meter, 35 watts input on 160, 80, 40, 20, 15, 11 and 10 meters, provisions for modulator tie-in, Grid Meter Jack, complete with tubes and built-in power supply, VFO or Crystal ("Rubbers" the Crystal also), Cabinet 17" x 9" x 11". Tubes OSC 6AG7, BUFF 6AG7, P. A. 807. Volt. Reg. VR-150 Rect. 5U4G.

Mod. 600 Amateur Net **$119.95**
Mod. 500 Amateur Net **$109.95**

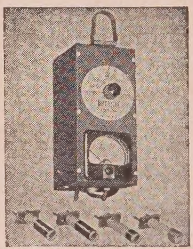
ANTENNA COUPLER for all bands Model 50. Designed for Transmaster. **$11.95**

NO HAM STATION SHOULD BE WITHOUT A

Lysco Grid Dip Meter

NOT A KIT

955 OSC.
3.4 to 170 Mc. as Dip Meter
3.4 to 340 Mc. as Signal Generator
5 Plug-in Coils



Phone Monitor
CW Monitor
Harmonic Indicator
Absorption Wavemeter
Measures Tuned Circuits, Antennas, etc.

Complete ready to operate **Model DMR** **$33.50** net

OTHER LYSCO PRODUCTS

MOBILE CONVERTERS: Model 130—26 to 30 M.C., Model 132—14 to 14.4 M.C., Model 133—3.5 to 4 M.C. Complete with Tubes . . . . **$32.50** Net
MOBILE TRANSMITTERS: Model 129—26 to 30 M.C., Model 175—3.5 to 4 M.C. . . . . **$23.95** Net less Tubes
MOBILE VFO: Model 381—3.5 to 7, 7 to 7.5 MCS, Model 381-R—3.5 to 7, 7 to 7.5 MCS. Remote Tuned Circuit on 381. Amateur Net . . . . 381—**$21.95**
381-R . . . . **$27.95.** Complete

BUY LYSCO PRODUCTS AT LEADING DISTRIBUTORS

LYSCO MFG. CO., Inc.

1401 CLINTON ST. **HOBOKEN, N. J.**

Feenix, Ariz.

Deer Hon. Ed:

There are an evil force at work in this country, and I knowing you want to be first to be informed of same. In factly, Scratchi are writing to enroll you as a member in my new organization, the S.P.A.O.T.S. At the moment Scratchi is president, vice-president, treasurer and secretary, but this only temporary thing on acct. only one member in the association.

I are calling this the Society for the Prevention of Amateurs Owning Television Sets. Hokendoke!! are you realizing what are happening to hamdom? Every ham what are finally giving in to the XYL and getting television receiver are gone goose. Either he causes TVI and the XYL won't let him on the air, or he getting so interested in TV programs that he forgetting all about amateur radio.

But this not even the worst of it. Some hams are rebuilding their television receivers, putting up fancier and fancier television antennas, and in general wasting so much time that they are forgetting how to sending code. The first thing we knowing hams will be forgetting to renew licenses. (This last point not bothering Scratchi, as never bothering to get license after FCC revoking same before war.)

At this point you are probably muttering something like where have Scratchi been for last two years not knowing all this, but remembering, Hon. Ed., that Scratchi are living in Arizona, where, up to last year, television transmitter are as scarce as two-meter WAZ certificate.

All this are coming up a cupple of months ago when I are deciding to visit some ham friends in Feenix. As you knowing, Feenix are having television transmitter about one year now. Well, Scratchi are having no luck in finding hams at home. I drive by their house, and lights are all off. After two days of this I start calling them on land line, and they saying they have been home, but not to minding lights out, because they watching television.

This are discouraging to Scratchi but then he getting bright ideas. Why not going down to Toosahn and visiting hams there. This seeming like red-hots idea, as Toosahn not having television transmitter. So, saying are doing and I take off for Toosahn. I going to see one ham, and before going in house notice that beam antenna are taken down and also nobody home. Next place are same story. Scratchi think that maybe this because Toosahn are now class-B licensing area, and maybe some hams not being able to convince inspector that they can read code now.

Finally finding one friend home. Things are looking quite normal, as finding him in back yard making new beam antenna. We are talking awhile about last Toosahn hamfest, and about friend who are not being such a hot outfielder on acct. imbibing too

(Continued on page 60)

ZERO BIAS

EDITORIAL

The proposed regulations for the Disaster Communications Service appear to us to provide a once-in-a-lifetime opportunity for Amateur Radio to demonstrate its often-proclaimed ability to be of service to the public in time of communications emergency. Although the frequency range set aside for the Disaster Service, 1750–1800 kc, can not possibly be the optimum for the many different types of emergency communications which are handled by amateurs, it is not intended that this service supplant our present emergency frequency distribution, but rather that it supplement our existing arrangements. For example, it would be the height of foolishness to transfer our present local 144-mc nets to the new region—can you imagine the havoc an RTTY circuit could set up in that narrow band? No, the new setup will be used, just as the FCC intends, as a liaison arrangement between amateur emergency nets and those of other services. We can't see that it can in any way detract from our present efficient setups, and can be another step in the long road toward recognition by the general public. We'll have to sit tight for the moment to see what will come out when the final regulations are announced; and then it will behoove us to jump in and "take over" on the local level.

The local communications setup in each community must be headed by an amateur—not by a so-called communications expert from one of the wire companies. We are going to have to be active in political circles, at the community level, and that may take a lot of doing for many of us. The CD group in your town must be brought to realize that there is already in existence an organized emergency communications facility, and that the head of that facility is the man to head up communications for the CD group.

Contests

The contest season is upon us. *CQ*'s Third Annual World Wide DX Contest (Oct. 28–30, Nov. 4–6) will be here before we know it, and many other contests are on the crowded ham calendar for the 1950–51 operating season. We're all for them, since we know of no amateur activity which provides a better test of operator/station staying power than a knock-down-and-drag-out contest. Traffic nets, working DX, and the many other day to day ham activities are okay, but if you want to find out what you and your station can do under "forced draft" it is hard to beat the World Wide DX Contest. Some day some ham is going to come up with the answer to the question "How do they (the big boys) do it?" Until then we ordinary hams can but hope that we and our stations will hold together through the contest period.

This seems to be a good time for the annual overhaul of the station. Is everything operating just as we wish it to or are there changes we can make to become more efficient in our operations? How about that outboard Q5er that has been hanging on the edge of the operating table for the past two years? That sick tube in the final which tries to take off every once in a while—that microphonic first detector in the receiver—now is the time to get those petty annoyances straightened out.

TVI

We bought a new TV set the other day and installed its antenna about a foot from our all-band doublet. With the addition of a high-pass filter inside the TV set, right at the input to the "front end," we now have TVI-free operation under the worst possible circumstances. It's a beautiful and effective demonstration to irate neighbors who blame everything from auto ignition to lightning disturbances on us, and answers their complaints better than a couple of hours of explanation. We recommend such a setup if you're plagued with unjustified complaints.

If, however, you are causing TVI in some of the local TV sets, installing a receiver like we did will provide you with the best possible laboratory for the correction of your troubles. If you can clear things up on that set you have really done a job. But don't forget to look at all channels while you are transmitting on each band—your neighbors might not agree with you on your selection of program material.

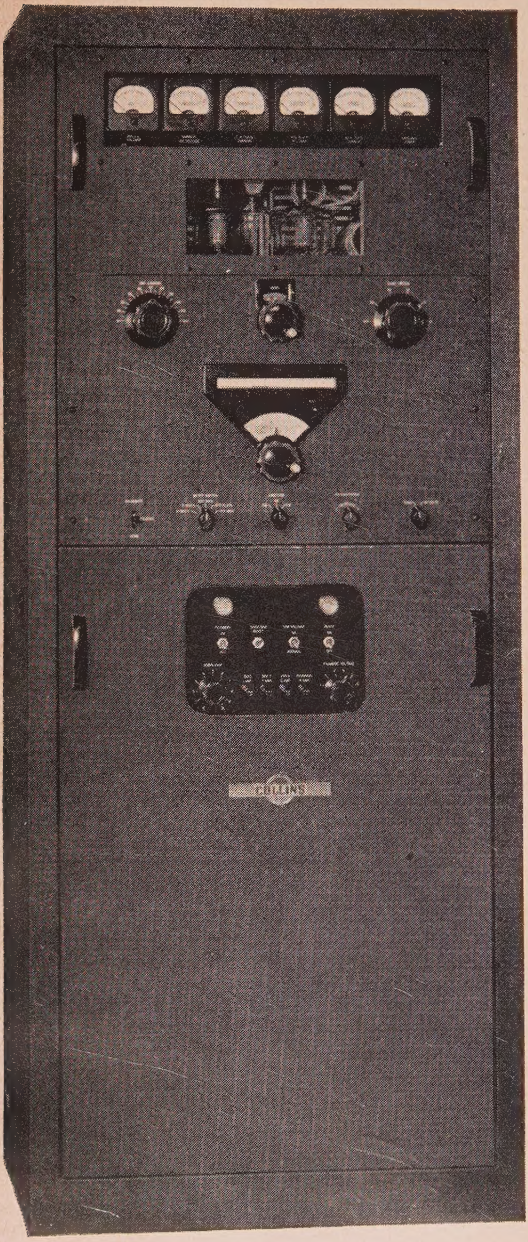
We have yet to run across a ham with TV troubles who has really followed the "book procedures" on curing TVI. In the general case the installation of a low-pass filter at the transmitter is not sufficient to clear up TVI, no matter what their proponents claim. The whole "course"—low-pass filter at the proper point at the transmitter, really adequate shielding and filtering of all leads and the transmitter itself, a high-pass filter at the TV receiver input, and, in many cases, a line filter at the TV receiver power line input—will often be called for. Don't give up the TVI battle as "impossible" until you've tried them all—together, not separately.

Our Allies

All too few of us are presently aligned with the various non-amateur radio facilities. Although MARS and the Navy's Electronic Warfare units require, at the moment, that one be a member of the armed forces, though in a reserve status, there are other services, such as the Coast Guard Auxiliary and the CAP, which have a definite need for the services of amateurs for the maintenance of their communications circuits, particularly during periods of emergency. Although we should always retain our identity as amateurs, it is very much to our advantage, on a long-term basis, to lend a hand wherever we can. We feel that every amateur who can possibly devote the time to it should align himself, his training, and his station with at least one of the non-amateur services which need our help as amateurs.

—Doc, W2BYF

Announcing the Collins



The tuning dial escutcheon matches that of the 75A-2 and 51J-1 receivers

The new Collins KW-1 will satisfy the most exacting demand for built-in convenience of operation. This kilowatt husky, completely contained in an attractive wrinkle-finish cabinet, is as easy to operate as a Collins 32V.

The KW-1 is a product of the most modern design techniques, resulting in a well integrated, efficient rig in which maximum attention has been given to the amateur's TVI problem. Here are some of its features:

Power Input: 1000 watts on CW, phone, and narrow band FM. Provision for NBFM is provided as standard equipment in the transmitter.

Frequency Range: This transmitter was designed specifically for the best possible performance on the 160, 80, 40, 20, 15, 11-10 meter amateur bands.

Tuning Controls: Complete bandswitching of the exciter, driver, and power amplifier is accomplished by a single control on the front of the transmitter. This reduces to 4 the number of tuning control functions required: bandswitch selection, frequency setting, PA tuning, and PA loading. Over any narrow frequency

KW-1 amateur transmitter

One kilowatt input phone, CW, and NBFM

range, only frequency setting adjustment is necessary. Frequency control is by means of a newly developed, extremely stable, hermetically sealed master oscillator.

Desk Operation: The entire exciter-power amplifier section is removable and may be placed on the operating desk if desired. However, the operating controls can all be reached from a sitting position if the transmitter is installed adjoining the desk.

TVI Reduction is accomplished through the utilization of multiple tuned circuits at the output frequency on every band. A minimum of three circuits at the output frequency greatly attenuate not only the second and third harmonics, but sub-harmonics as well. In addition, particular attention has been paid to filtering all the control and power leads entering the exciter - power amplifier compartment, which itself is a totally enclosed and shielded structure. A Collins 35C-1 low pass filter is incorporated as standard equipment.

Output Network: A conventional pi followed by an L section for increased harmonic attenuation.

Audio System: The speech amplifier has a peak clipper plus a low and high level filter. It permits high-percentage modulation without splatter, adding notably to intelligibility.

Tube Line-up: Exciter — one 6BA6, five 6AQ5's, one 807W, one 12AU7, one 6AL5. Power amplifier — two 4-250A's. Speech amplifier — one 12AX7, one 6AL5, two 12AU7's, two 6B4G's, two 810's. Rectifiers — two 872's, one 5R4GY, three 5V4's.

Meters: Modulator current, PA plate current, high voltage, line voltage, multi-purpose meter, antenna ammeter.

Circuit Protection: Line fuses plus overload relay in Class C amplifier current lead.

Output Impedance: 50 ohms with 2.5-1 standing wave ratio.

Power Input: 115/230 volts 60 cycle single phase grounded neutral.

Size: 28″ wide, 18″ deep, 66½″ high.

Deliveries to Collins distributors will begin in March. Price to be announced.

If you intend to buy a KW-1, we urge that you make arrangements at once with your Collins distributor.

For the best in amateur equipment, it's . . . COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, NEW YORK 18
2700 West Olive Avenue, BURBANK

Here, at last, is a really modern communications receiver. It provides optimum reception on c.w., a.m., f.m., p.m., and s.s.s.c. Until you build and try this unit you will not realize how wide our bands are.

R. P. HAVILAND, W2JDA*

AN ADVANCED

The receiver described here was planned to satisfy a series of requirements which were laid down to cover expected needs for several years in the future. The most important of these were:

The receiver should give optimum results for all types of transmissions widely used by amateurs, including c.w., a.m., f.m., p.m., and s.s.s.c.

It should provide the greatest possible freedom from interference (QRM).

It should be simple to operate.

It should be mechanically flexible, both to simplify construction and to permit easy modification as required by changed conditions, new techniques or repairs.

General Design

A review of the techniques of reception of the various types of signals showed that the most complicated was the reception of single sideband suppressed carrier telephony. This review also showed that all components and techniques needed for proper reception of all other types of signals would be included if the phasing system of single sideband demodulation was employed. This established the basic design.

Proper use of the phasing system of demodulation makes possible the selection of either sideband at will, and so provides a major anti-QRM feature. The value of this is made greater by use of the exalted carrier principle, which prevents loss of modulation of the desired signal by strong QRM. This is done by introducing a locally generated (synthetic) carrier which is very large compared to any signal. Since the synthetic carrier is required for suppressed carrier transmission, this feature requires no added complexity.

For those times when both sidebands in normal transmission show interference, it is possible to secure an added anti-QRM feature by making use of the characteristic of the human hearing system which permits us to single out a desired sound and ignore others. This is done by sending one sideband to a speaker located close to one ear, and the other sideband to a second speaker located close to the other ear. Since the desired signal is heard by both ears, it is easy to separate it from the interfering signals, each of which come to only one ear. (This can be done with split phones, also).

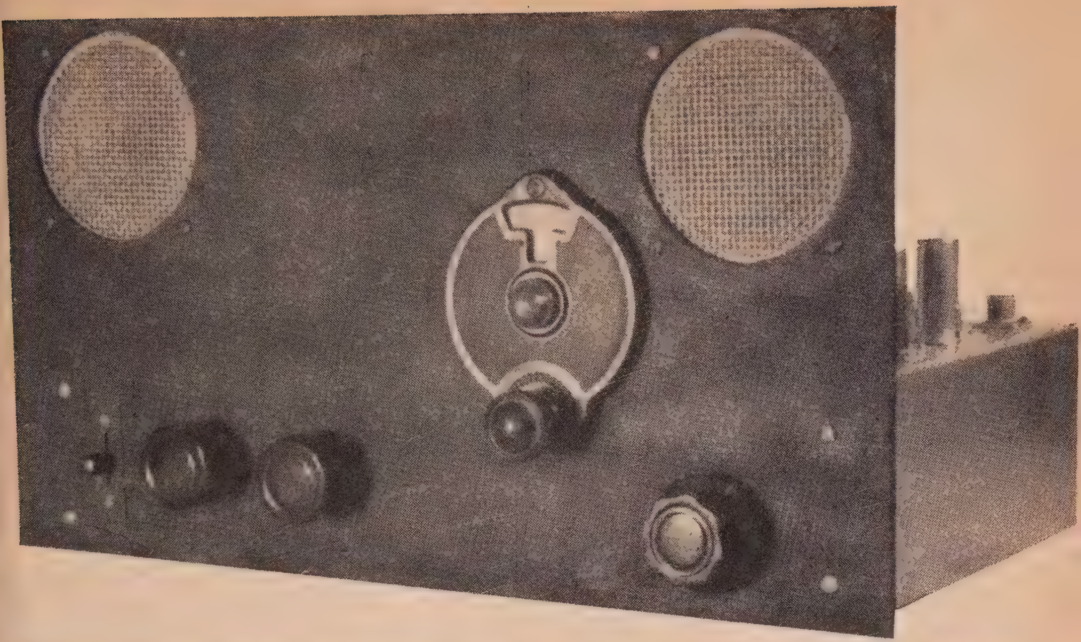
In planning the receiver, it was found that the operation and tuning could be made very simple. Once the desired band had been selected, and the audio level set, the only operations required are tuning, r.f. gain setting, and sideband selection. Accordingly, the layout was arranged to place the tuning knob on the right, the sideband selector on the left, and the r.f. gain near the center, where it was convenient to either hand. This has worked well.

To avoid the complexities of coil switching it is desirable that a receiver cover only a single band. A series of converters makes it possible to retain this simplicity, and still have multi-band operation. For this receiver these use broad-band fixed tune high frequency stages, and a crystal controlled oscillator. Tuning is accomplished by a tuner covering the lowest frequency band, which becomes a tuned i.f. system on the higher bands. This system is certainly the most convenient in operation, and can be made to give as good performance as the more common tuned converter. The one defect of the system is the cross modulation sometimes encountered, but this can be eliminated by keeping the r.f. gain to a value just sufficient to overcome mixer noise.

With this system the tuning range on the lowest frequency band must be sufficient to cover the widest of the desired bands. Here, the basic tuner is designed to cover the 80-meter band, with the complete range being 3.0 to 5.0 mc, which permits full coverage of the present 10-meter band. The basic range is sufficiently high to give good image

---

* *220 James St., Scotia 2, N. Y.*



AMATEUR RECEIVER

rejection, and still is sufficiently low that construction problems are not serious.

Associated with the tuning range is the problem of positioning the locally-generated exalted carrier. For naturalness of voice, this must be within 20 cycles of the incoming carrier, and even closer control is desirable. The crystal-controlled converters, and good mechanical and electrical bandspread, are a help, but accumulated errors such as drift in the transmitter and receiver, and such problems as backlash, can make tuning very annoying. Adding AFC to the local carrier eliminates most of the trouble, and so is included.

The final feature of the receiver is the method of construction. Each group of components, such as the i.f. amplifier, is mounted on an individual subchassis. These units are interconnected after final assembly. This system greatly simplifies the problem of construction and tests, since each unit can be built and then tested in conjunction with a conventional receiver. It also gives better performance, through improved shielding.

Demodulator Unit

Heart of the receiver is the demodulator system shown in *Fig. 1*. This is almost exactly identical with the adapter developed by W2KUJ[1]. It was chosen for this receiver after breadboard tests showed that it was relatively simple to adjust, and that the performance was good.

The demodulation action is as follows: A local carrier is generated by the electron coupled oscillator circuit associated with V_3. Two components 90° apart in time phase are formed by the critically coupled i.f. transformer T_1. These components are fed to the cathodes of the demodulator diodes V_1 and V_2. These diodes act as electronic switches, with conduction occuring when the cathode is negative.

If an unmodulated carrier identical in frequency with the local oscillator is fed to the input diode sections, two d.c. voltages will be developed due to the switching action. The voltage at *B* will be negative, and will be proportional to the strength of the incoming signal, while the voltage at *A* may be positive or negative, depending on the phase difference between the incoming signal and the local oscillator. For perfect tuning this voltage is zero.

The voltage at *A* is used to control the frequency of the local oscillator by means of the reactance tube V_4. This holds the frequency of the local oscillator to exactly the frequency of the incoming carrier. The amount of drift which the system can correct varies with signal strength, and is about 100 cycles for weak signals, and several kc for strong ones. Loss of control is immediately evident, as a heterodyne between the incoming signal and the local oscillator occurs.

If the incoming signal is modulated, the modu-

---

[1] Norgaard, D. E., Practical Single Sideband Reception, *QST*, July 1948, pp. 11–15.

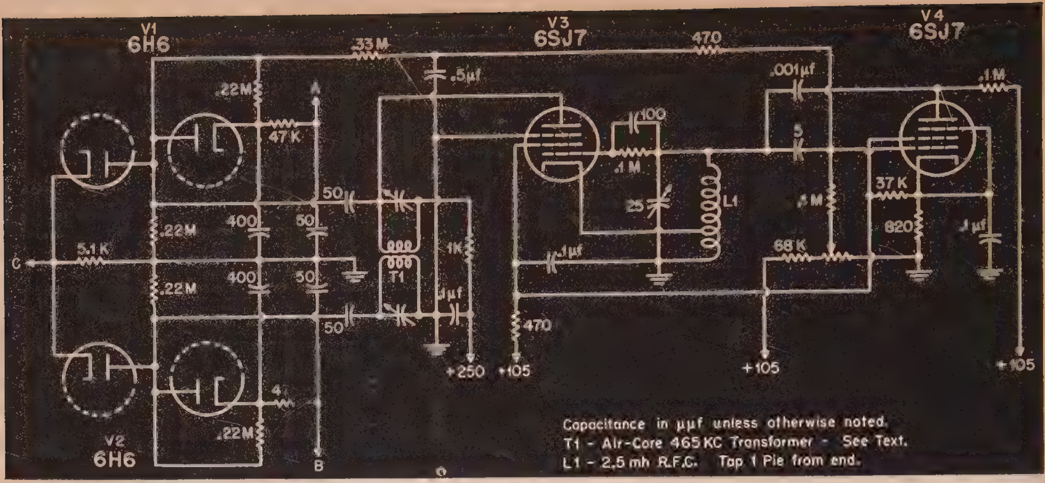


Fig. 1. The heart of the receiver is the demodulator unit, shown here. The letters A, B, and C indicate connections to other units.

lation appears at the demodulator outputs *A-B*. The phase of the modulation at *B* is identical to that of the incoming signal, while that at *A* is shifted 90°, the direction of phase shift being opposite for frequencies above and below the frequency of the local oscillator. With the local oscillator synchronized to an incoming signal, the phase shift direction is opposite for the upper and lower side bands. This change in direction of phase shift makes possible sideband separation.

Audio Unit

Associated with the demodulator is the audio phase shift section and audio amplifier system shown in *Fig. 2*.

The audio phase shift networks are of the bridge type first described by Dome, and have been used in several designs.[2] This type of phase shifter demands use of close tolerance resistors and condensers, but it has the great advantage of requiring no adjustment, and also of being incapable of misadjustment.

The resistors and condensers specified were selected to an accuracy of 2%, using a G-R impedance bridge. This gives a sideband rejection of about 35 db. Commercial 5% tolerance components may be used, at some loss in sideband rejection. Components of 1% tolerance are available at prices which are not too unreasonable, and are recommended if a bridge and a reasonable stock of resistors and condensers are not available. (It would be better still if some enterprising manufacturer would make the complete network available, nicely cased, at a moderate price.)

The networks require push-pull input, at a relatively low impedance level. These are supplied by the phase splitting triodes V_5. The network outputs are combined by the adder tubes V_6 and V_7, one sideband appearing at the output of V_6, and the other at the output of V_7. Balance potentiometers permit adjustment of the rejection of the unwanted sideband, to compensate for tube variations, and, to some extent, improper phase shift in the audio networks. With reasonable tube uniformity, nearly perfect cancellation can be secured at one frequency.

The audio output stages are conventional, except that small coupling condensers and relatively large "tone control" condensers are used to reduce the audio bandwidth. This helps in reducing QRM.

The three-position switch in the audio input circuits allows selection of either the upper or lower sidebands, or provides independent feed for binaural reception. The speakers should be located on opposite sides of the receiver panel, or, if external, should be similarly placed.

I. F. Unit

The i.f. amplifier, shown in *Fig. 3*, is conventional except for the output circuit. This uses a beat-frequency oscillator transformer as a step-down auto-transformer, to give a low impedance input for the diode demodulators.

With five tuned circuits in the i.f. amplifier, the selectivity compares favorably with the average commercial receiver. Greater selectivity is often desirable, however. A suggested method of obtain-

---

[2] For example, see *QST*, July 1948, p. 42.

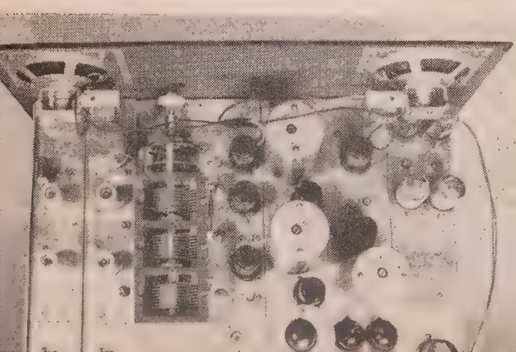


Fig. 9. The "unit" type of construction can be plainly seen here. The Velvet Vernier reduction unit is mounted directly on the tuning gang. The twin speakers are for binaural reception.

The construction can be seen in detail in this bottom view. The i.f., demodulator, and audio sub-chasses are 12″ long by 2½″ wide. The r.f. chassis is 5″ wide. The two converter units are each 2¼″ wide. The use of .051″ or .062″ aluminum is recommended.

ing this is to use cascade transformers[3]. Another method is to introduce a limited amount of regeneration[1], which can be done easily by changing the relative placement (dress) of the grid and plate leads to the i.f. tubes.

R. F. Tuner

The r.f. tuner shown in *Fig. 4* is also conventional. Pentode detection is used, since it tends to introduce less noise than the common pentagrid mixer. Grid injection of the local oscillator signal is used for simplicity.

The tuning condensers are of the "midline" type. Rather large parallel padding condensers are used for bandspread adjustment, since this tends to make the tuning rate constant with respect to dial rotation. Permability tuned coils permit adjustment of tracking.

A vital part of the tuner is the dial. For easy tuning this should have a tuning ratio of at least 20 : 1, and 50 : 1 would be better. For operating ease, it should be possible to calibrate the dial directly in frequency. Also, such features as zero backlash and two-speed tuning are desirable.

Since no suitable dial could be found, a reasonably satisfactory unit was constructed from the junk box. A National Type B was used to drive the mechanism from a Velvet Vernier which is mounted directly on the tuning condenser (*Fig. 9*). This gives reasonably low backlash, tuning ratios ranging from 25 : 1 up to 100 : 1, and the possibility of direct calibration. The disadvantage of this system is that the Type B dial turns through more than 360°. A revolution indicator could be driven from the Velvet Vernier mechanism, but this has not been attempted so far, since a still better dial is being sought.

It should be noted that it is not necessary to provide a calibration for each band if accurate

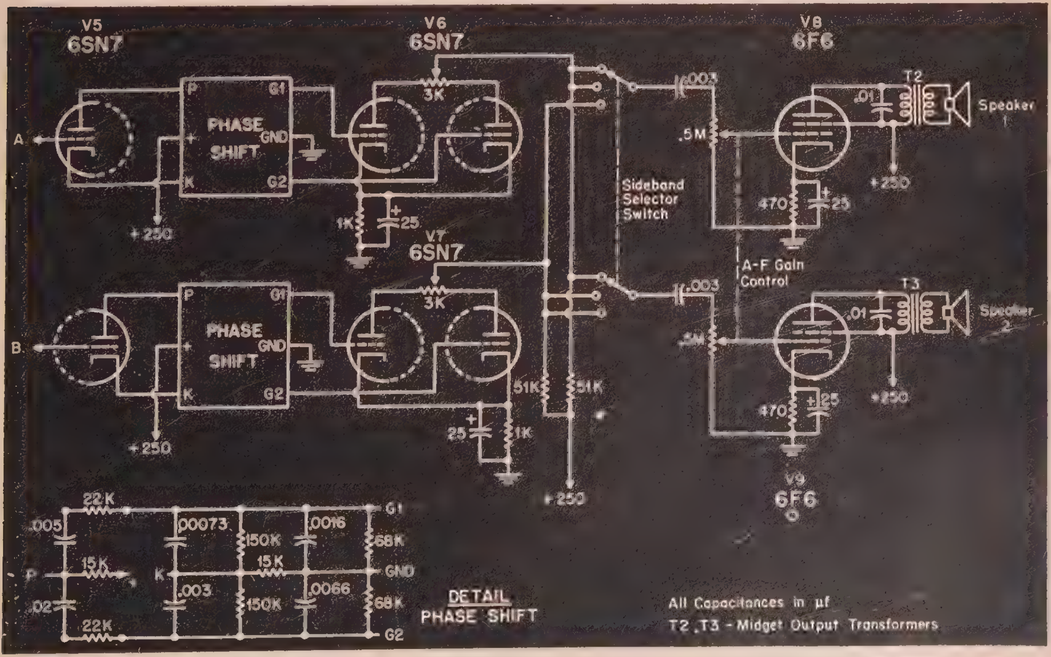
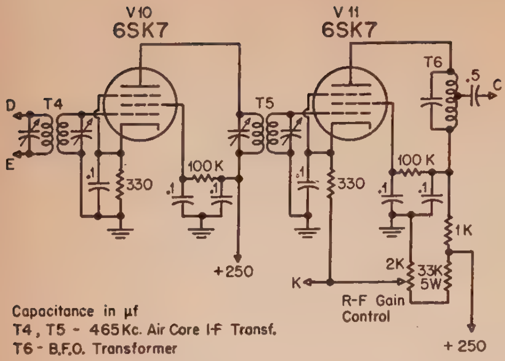


Fig. 2. The schematic of the audio phase shift and a.f. amplifier sections.

---

[3] *The Radio Handbook,* Eight Edition, p. 153.



Capacitance in µf
T4, T5 - 465Kc. Air Core I-F Transf.
T6 - B.F.O. Transformer

Fig. 3. The i.f. amplifier section is straightforward except for the output transformer, T_6.

crystals are used. The basic calibration should cover only the range of the tuner. Adding the frequency of the oscillator in use to the dial reading then gives the actual frequency.

Converters

Several types of converters have been used in this receiver. Typical circuits are shown in *Figs. 5, 6* and *7*. They are basically similar in that each uses a crystal oscillator, and fixed-tuned r.f. circuits.

The pentode amplifier unit in *Fig. 5* is similar in design and construction to the i.f. strips used extensively in radar equipment. While the noise figure is reasonable it is not as good as the grounded-grid units shown in *Figs. 6* and *7*, which will be recognized as being similar to the R-9'er. However, securing the optimum performance from the grounded-grid type requires a noise generator, and, if this is not available, the pentode type is recommended.

To date, only 14 and 28-mc converters have been constructed. These have been built up as independent units, filling all availble space in the chassis. Somewhat better layout would permit placing two units on a single chassis, thus making it possible to use a total of 4 converters. Also, the band switch may be wired to external converters if desired. The exact system used should be based on personal operating habits.

Power Supply

The power supply is shown in *Fig. 8*. A VR-105 furnishes a source of regulated voltage for the oscillator and high frequency circuits, as required for good frequency stability. It will be noted that the high voltage circuit uses an unusually large amount of capacity. This is necessary to secure proper operation of the phase shift circuits, and, in addition, gives a very low hum level.

Construction

The general construction of the receiver is evident from *Fig. 9*. The i.f., demodulator and audio sub-chasses are 12″ long, by 2½″ wide, while the r.f. chassis is 5″ wide. These are formed into U-shaped strips, one lip being ½″ wide and the other 3″ wide, thus forming an inter-unit shield. The converter units are 2¼″ wide, to just fill the standard 17″ chassis space.

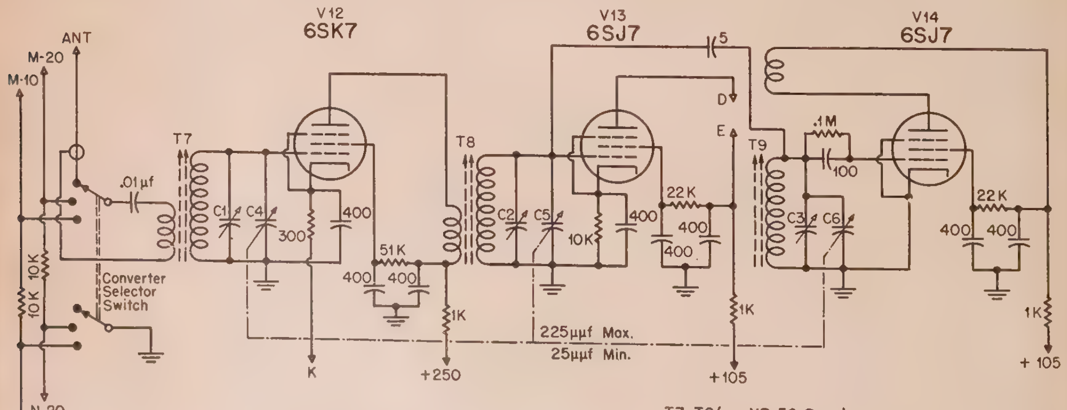
Each sub-chassis is notched at each end, to bolt to the front and rear sections which are also U-shaped, 4″ high by 17″ long. The end sections are very flat Us, 4″ by 12″.

Some of the original units are constructed of .019″ aluminum. It has been found that this is too light and flimsy, and .051″ or .062″ material is recommended.

Test Equipment

To secure proper operation of the receiver some test equipment is necessary. The three essential items are an oscilloscope, a vacuum tube voltmeter, and a signal generator. While an ordinary voltmeter and a frequency meter (or even a conventional receiver) can be substituted for the last two items, the scope is a necessity.

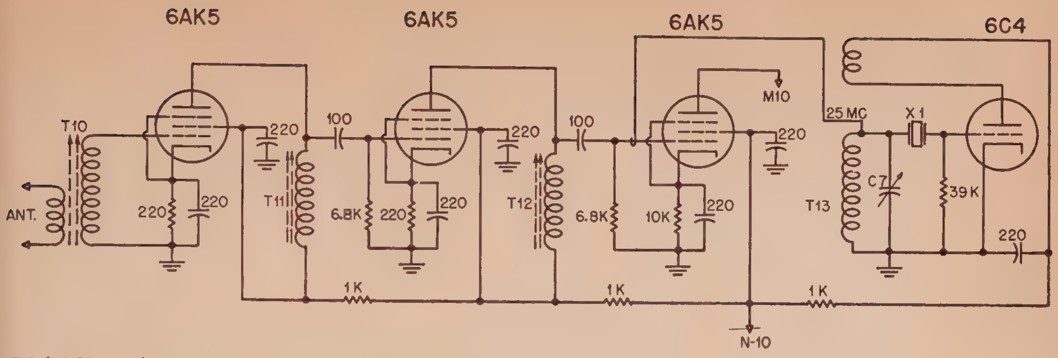
If an ordinary voltmeter is to be used, a special lead should be made up. This should have a 10-K



All Capacitances in µµf unless otherwise noted.
C1, C2, C3 - 100 µµf "APC"

T7 T8 (on XR-50 Form)
Pri.-9T. #30E. Sec.-25T. #25E.
T9 (on XR-50 Form)
Pri.-9T. #30E Sec.-22T. #25E.

Fig. 4. The r.f. unit covers the range 3-5 mc, including the entire 80-meter band.



T10 (XR-50 Form)
Pri. 12 T. #30E. Sec. 17 T. #22E.
T11, T12 (XR-50 Form)
10 T. #22E.
T13 (7/8" Dia. Form)
Pri. 10 T. #20E. Sec. 4 T. #20E.

Capacitance in μμf
X-1 - 8.33 MC Crystal
C7 - 25μμf "APC"

Fig. 5. One of the 28-mc converters using pentode amplifiers. See text.

resistor in the test prod. This permits checking the d.c. voltage on a circuit which also carries a.c., without causing undue loading. Also, if a receiver is substituted, a length of shielded cable (coax) should be made up with clips on each end, for use as a patch cord.

Adjustment

After completing the receiver it should be wire checked. Filament and plate voltages may then be applied. Plates, screens and cathodes should be checked for voltage.

Adjustment should start with the demodulator chassis. Ground temporarily the input *C*. Set the bias potentiometer on the AFC tube to give minus 2 volts between the grid and cathode of this tube. Adjust the oscillator grid tuning condenser to give the desired i.f. frequency (usually 465 k.c.) using a frequency meter, signal generator, or by coupling to the input i.f. section of a conventional receiver with the BFO on.

Place a d.c. voltmeter between the plates of the upper diode and ground. Adjust the primary of the phase shifting i.f. transformer to give maximum voltage. Repeat for the lower diode, this time tuning the secondary.

Since normal i.f. transformers are undercoupled, the maximum voltage developed at the lower diode will be considerably less than for the upper one. It is necessary that the coupling be increased until these voltages are equal, to secure proper operation of the demodulator diodes. To increase the coupling, remove the shield from the i.f. transformer, warm the wax holding the winding, and slide the coils closer together. Then recheck as in the previous paragraph, and repeat until the voltages are within 5 volts of each other, and both voltages are about 70 volts. When this is completed, the i.f. coils will be spaced about their own diameter.

It is possible to secure equal voltages if the coils are over-coupled, but this will not give the proper phase shift. Since it is quite easy to overcouple, it is advisable to change the coupling in small steps, and to make the tuning adjustment carefully. An occasional recheck of the reactance tube bias and oscillator frequency is also desirable.

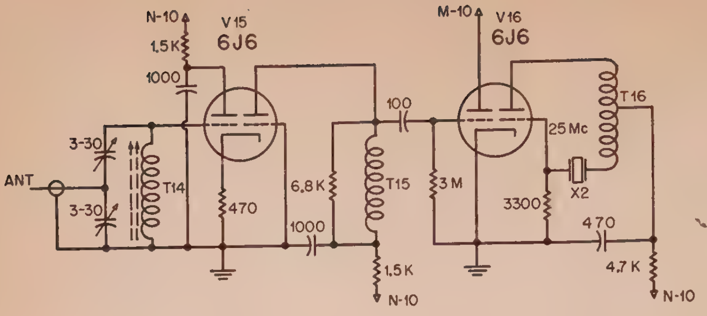
After completing this adjustment, shift the voltmeter to the output marked *A*. This should indicate about plus one volt. Remove the short on the input, and couple an i.f. signal to the grid of the last i.f. tube. Swing the frequency of this signal slowly through the i.f. frequency. As this is done, the voltage at *A* should show a sudden jump, as the local oscillator locks in. Further swings of the signal generator frequency should cause the voltage at *A* to swing positive and negative, indicating proper AFC action. Note that if the frequency shift is too great, control will be lost, and the voltage at *A* will return to normal.

Set the signal strength to give a maximum swing at *A* of about 1 volt. Adjust the tuning of T_5 to give maximum voltage at *A*. Vary the setting of the bias control, and the oscillator tuning, until the maximum voltage swing at *A* is equal for positive and negative excursions of frequency, checking that the uncontrolled oscillator frequency and also the frequency for zero voltage remain at the desired i.f. frequency.

Reduce the strength of the signal being fed to the last i.f. tube until the swing at *A* is very small as the input signal frequency is changed. Remove the voltmeter, and couple the horizontal amplifier of the scope to *A*, and the vertical amplifier to *B*. Set the amplifier gains to the same level. Now, as the signal generator is swung from above to below the i.f. frequency, the scope trace should expand from a point to some figure which resembles a circle, drop suddenly to a point, then change again to resemble a circle, gradually contracting to a point. It will also be observed that the direction of rotation of the figure changes for frequencies above and below the sudden contraction.

The tuning of the transformer T_1, and also the coupling, if necessary, should now be adjusted until the scope figure is as nearly a circle as is possible. In doing this, care should be taken to set the scope gain controls to give equal horizontal and vertical deflection.

Change the scope input leads to the grids of the



Capacitance in µµf

X2 - 8.33 Mc Crystal

T14 (XR-50 Form)
17 T. # 22

T15 (XR-50 Form)
10 T. # 22

T16 (XR-50 Form)
20 T. # 22 Tap at 8T.

Fig. 6. A 28-mc converter using grounded-grid techniques.

upper adder tube. Shift the frequency as before. The scope trace should expand from a dot to a figure resembling a straight line, inclined at a 45° angle, drop suddenly to a point, then again become an almost straight line rotated 90° from the first one, and gradually shrink to a point. The 90° rotation indicates that the signals are changing from adding to subtracting as the frequency shifts. The more closely the figure approaches a straight line, the better the sideband rejection will be.

Check also at the grids of the lower adder tube, then retouch the tuning of the phase shift transformer slightly to get the scope figures to approach a straight line as closely as possible on both adder grids, for any input frequency.

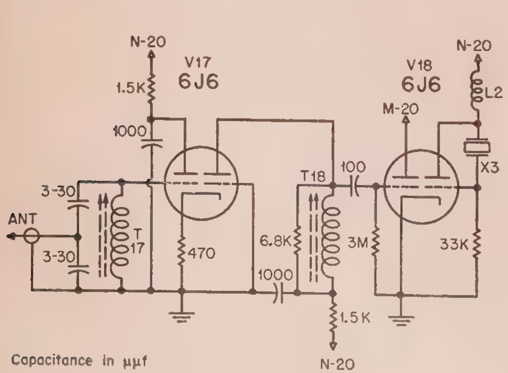
Now turn up the audio gain control. As the signal generator frequency is shifted above and below the i.f. frequency, the heterodyne with the local oscillator should shift from one speaker to the other. Throwing the selector switch to one sideband position should nearly eliminate the heterodyne on one side of the i.f. frequency. Interchange the inputs to the audio stages, and the outputs to the speakers as required to make the selector switch and the speakers agree. (Left speaker for the lower sideband is suggested).

Set the adjusting potentiometers in the adder tube plate circuits to give maximum rejection of the weaker, or unwanted sideband. Shift the vertical scope input to the output of the upper adder tube, and set the horizontal gain to zero. Compare the amplitude for signals above and below the i.f. frequency. This should be about 50:1 for the audio phase shift components specified. With 1% tolerance components in the phase shifter it should be about 100:1, and with 5% components, about 20:1.

If at any point the results are not as described, repeat the adjustments, then check for wiring mistakes, and for faulty tubes and other components. It may be found that two or three attempts at adjustment must be made before the results appear as described. The AFC circuit, and the adjustment of the phase shifting transformer coupling will probably be the most troublesome.

Tune the remainder of the i.f. system, the r.f. tuner and the converters as usual. The only unusual operation will be in securing proper operation of the overtone oscillators in the converters of *Figs. 5* and *6*. A wavemeter is of considerable assistance here. Some adjustment of feed-back may be necessary, by changing the number of turns in the plate windings, since there is appreciable variation in the characteristics of crystals when operated on their third overtone. Also, if exact frequency is desired, it will be necessary to start with a crystal of lower frequency than specified, and grind it to give the proper overtone frequency, or to buy a crystal calibrated for overtone use. This refinement is not necessary if frequency errors of a few kc are acceptable.

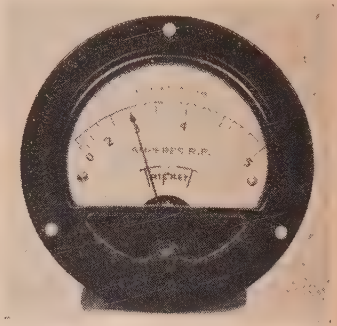
(*Continued on page 64*)



Capacitance in µµf
X-3 10.0 Mc Crystal
T17 - 36T. #30E. (XR-50 Form)
T18 - 20T. #30E. (XR-50 Form)
L2 - 1.0 Mh. R.F.C.

Fig. 7. The 14-mc converter, with grounded-grid front end. It is recommended that a noise-generator be used to set up this type converter. If a noise-generator is not available a 14-mc unit along the lines of Fig. 5 should be used.

GETTING THE MOST OUT OF YOUR TRANSMITTER



WILFRED M. SCHERER, W2AEF*

How often one hears the remark, "This antenna works fine. See how well it loads up the final!" Yes my friend, it loads the final nicely, but is most of the available r.f. actually getting into the antenna system?

Part of this may be answered by whether or not the antenna is correctly tuned and matched to the transmission line. This has been covered in other articles, so it will not be taken up here.

The other part of the answer may be found in whether or not the transmission line is correctly matched or coupled to the final amplifier. In order to avoid any lengthy technical discussion as to why the proper match is required at this point, suffice it to say that this is an important requisite, and although the line may load up the final, it is not necessarily an indication that the maximum r.f. is actually being taken by the load.

On many occasions this has been clearly demonstrated when a lamp bulb dummy load has been set up to load the final amplifier to the *same input* in both a matched and unmatched condition. Not only does the unmatched lamp bulb show less brilliance than when it is correctly matched, but also in cases involving tubes, such as the Eimac series, having plates which show some color at rated dissipation, the plate will have a brighter color with an unmatched load, indicating that the r.f., which should be taken by the load, is being dissipated in the tube.

Most of the material written about the design and impedance matching of coupled circuits between the feedline and the transmitter has been of a technical nature varying from simple calculations to rather involved theory. This data is excellent for both the beginner and the more advanced amateur; however, a simple method of visually determining the optimum arrangement may be of greater benefit.

The R.F. Ammeter

Although it is frowned upon by many as an old fashioned device, the r.f. ammeter, if correctly employed in the transmission line, will provide a relatively simple measure for facilitating the attainment of the best match between transmitter and line. The procedure will be more or less cut and try, but it need not be a lengthy process, and it will definitely supply a sure-fire indication of the best setup for maximum power transfer into the line.

The use of the meter for this purpose is not a new idea, but its employment has been considerably neglected, and it is our intent to reaquaint you with an old friend who will be faithful in assisting you to obtain easily the most from your equipment.

All that is required is that the r.f. ammeter be inserted directly at the input to the transmission line. See *Fig. 1.* Adjustments may be then made at the coupling circuit until the highest possible reading is indicated by the meter for a *given* plate input to the final amplifier. These adjustments may consist of any of the numerous conventional methods described in many articles or in the various handbooks, and they will involve both the impedance matching of the circuit and tuning out the line re-

---

* *100 E. Palisade Ave., Englewood, N. J.*

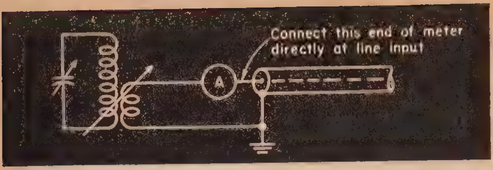


Fig. 1. The r.f. ammeter must be inserted directly at the input to the transmission line itself.

actance. *Figure 2* shows some of the methods for use with unbalanced lines. Similar steps may be taken with balanced lines.

The important point to remember is that the ammeter must be connected *directly* at the input of the transmission line where the impedance will remain essentially constant, regardless of changes at the coupling side of the meter. Also, the meter must always remain at the same point in the line, and no alterations should be made between it and the line during any set of adjustments. See *Fig. 3.* All changes should be made at the coupling side of the meter only, and they should be carried out while the transmitter is set at the same frequency during any group of comparative adjustments.

In the case of a line with unity s.w.r., the current along the line is uniform, but when the s.w.r. is higher than unity, the current will vary at different points along the line, the degree of variance being dependent upon the actual s.w.r.; however, for any given line at any one frequency, the ratio of current will remain the same at any one point (in this case, that at which the meter is connected), regardless of what is done at the coupling circuit. It may then be seen that, no matter what the s.w.r., as long as the meter is always inserted at the same place in the line, during any comparative adjustments at the coupling end, the meter reading will be an accurate measure of relative current, and it will indicate when the maximum transfer efficiency has been obtained.

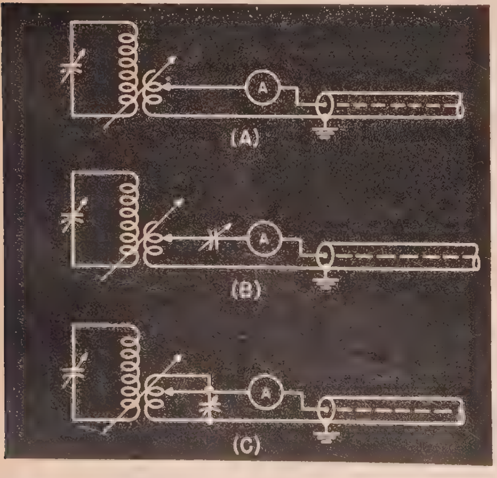


Fig. 2. Three simple ways to couple to unbalanced lines. In each case all adjustments must take place to the left of the ammeter.

Procedure

First couple line to link at the amplifier tank, and then vary the position of the link until the desired amount of plate current is drawn by the amplifier at resonance. If this situation can be realized, note the reading of the r.f. ammeter. Then vary the number of turns in the link, and/or employ one of the tunable methods, shown in *Fig. 2,* until the highest r.f. current is shown by the meter while the same desired plate current is drawn by the amplifier in each case. Current literature should be consulted regarding these and other tuning methods.

When a tunable arrangement is used, the system should first be peaked for maximum r.f. current, and then the coupling should be varied until the required plate current is drawn, following which the relative readings should be noted. Points may be found where the plate loading is sufficient, but the r.f. current will be lower than that found with other settings which also result in the same plate current. This will be the incorrect adjustment.

The proper setting for both tuning the link and for the correct amount of coupling will be the one which produces the maximum current at the feedline for a given plate input. The maximum obtainable input power to the line will then be realized. If the line reactance has also been tuned out, varying the position of the coupling inductor should have little, if any, effect upon the resonant setting of the final tank capacitor.

If sufficient loading is not at first realized, the procedure mentioned above may be followed, and the meter readings should be noted after sufficient loading is obtained.

The "given plate input", referred to above, should be that as determined from the desired operating plate current. If it is subsequently necessary to operate the amplifier at a higher or lower plate current, the coupling system will have to be slightly readjusted for best efficiency, because of the change then occurring in the plate impedance of the tube due to the difference in plate current.

The procedure for balanced lines is similar to that above. In addition, two meters may be used in each leg opposite one another, or one meter may be switched between these points, so an indication may be had of balance between sides of the line.

The correct range of the r.f. ammeter will depend upon the power output of the transmitter, the impedance at the point where the meter is to be connected, and the s.w.r. of the line. If the line is flat, or nearly so, the expected current may be calculated from $I = \sqrt{\frac{P}{R}}$, where P is the transmitter power output, and R is the line impedance. For a line having a high s.w.r., the maximum meter range required for 100 watts of power with low impedance lines (50–70 ohms) will be about 3–4 amperes. For a 500-ohm line it will be about 1.5 amperes. For 500 watts of power the respective ranges will be about 10 and 4 amperes. If the range of the available meter is too small, a shunt made of small size wire may be placed across the meter terminals. Meter calibration will not be necessary with the shunt, because the readings are only relative values.

If the line is flat and if the meter is connected directly at the input of the line, the power input to the line may be calculated from $P = I^2R$, where I is the current indicated by the meter, and R is the line impedance. If the line is not flat, having a higher than 1 : 1 s.w.r., the power can not be calculated unless the s.w.r., the electrical length of the line, and the reflected impedance at the meter are all known. If $P = I^2R$ equals more or less than 60–70% of the final amplifier input power (or otherwise calculated output power), the s.w.r. will most likely be higher than 1 : 1. On the other hand, if $P = I^2R$ is equivalent to the calculated amplifier output power, the s.w.r. will not necessarily be near 1 : 1, because lines of a certain length, and having a high s.w.r., can still indicate this situation.

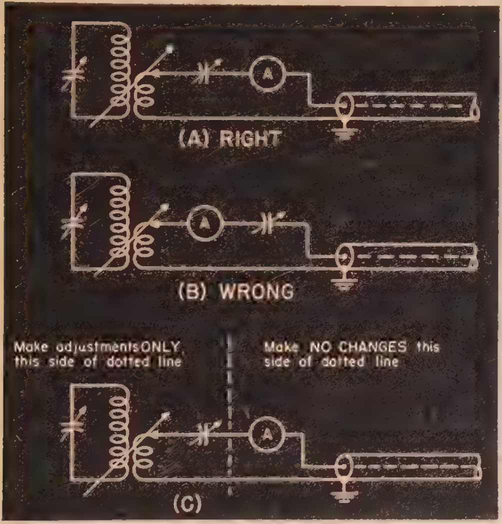

A
(A) RIGHT
A
(B) WRONG
Make adjustments ONLY this side of dotted line
Make NO CHANGES this side of dotted line
A
(C)

Fig. 3. The right, (A), (C), and wrong, (B), ways to assemble the ammeter and tunable circuit elements. Meter readings are meaningless if the meter is improperly located.

If the frequency of the transmitter is altered, slight changes may be required in the matching of the coupling system. Also, when it is readjusted for maximum output, the current into the feed line may be higher or lower than that at another frequency. This will depend upon the s.w.r. condition of the line at the new frequency involved, and it is not any definite indication of higher or lower output when shifting frequency. The meter readings are actually only relative values when made at the same frequency. Likewise, unless the line is flat, comparative meter readings between different lines or antenna systems is not indicative of relative power.

In the early days of amateur radio, the fellow whose antenna meter read the highest was usually considered to have the greatest amount of soup in his sky wire. Not so boys—unless the meter readings are made under similar conditions and at the same electrical point in the system.

If it is desired to use an antenna coupler, as shown at *Fig. 4,* the meter must be connected at the input to the line, and all adjustments should be made both at the coupling links and at the tuned coupler for maximum current into the feedline.

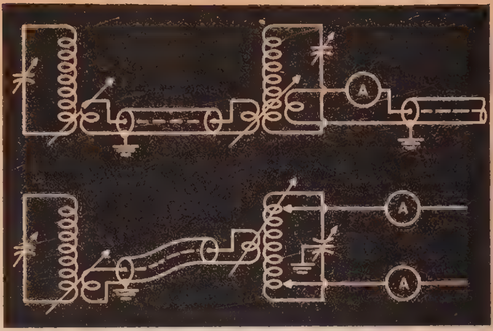


Fig. 4. A conventional antenna coupler can be used, but watch the placement of the ammeter!

When a low-pass filter is used in the output circuit of the transmitter, the meter may be inserted at either the line input or at the input to the filter. If the meter is left permanently installed at the filter input, it must be shielded to prevent direct harmonic radiation. No problems concerning the meter will be encountered when the filter is employed in conjunction with an antenna coupler arrangement, provided the filter is installed at the correct point, as indicated in *Fig. 5.*

Summary

In summarizing, the following points must be emphasized:

1. Connect the meter directly at the input to the line, and leave it at this point during any sequence of adjustments to be attempted at the coupling device.

2. Make all adjustments at the coupling side of the meter only. See *Fig. 3C.* Re-resonate amplifier tank with each change.

3. Make all adjustments for maximum r.f. current into the line, as shown by the meter, for a given desired plate input to the amplifier.

4. Meter readings will be indicative of relative power into *only a given transmission line* during any set of comparative adjustments, and the readings do not indicate the efficiency of the antenna system itself.

5. Any changes made in the line beyond the meter, or at the antenna, will require alterations at the coupling end until a maximum r.f. current is again obtained under the new set of line conditions.

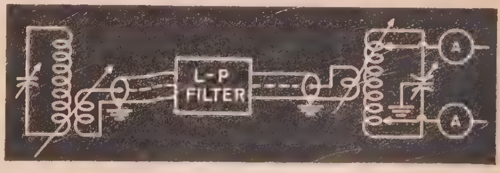
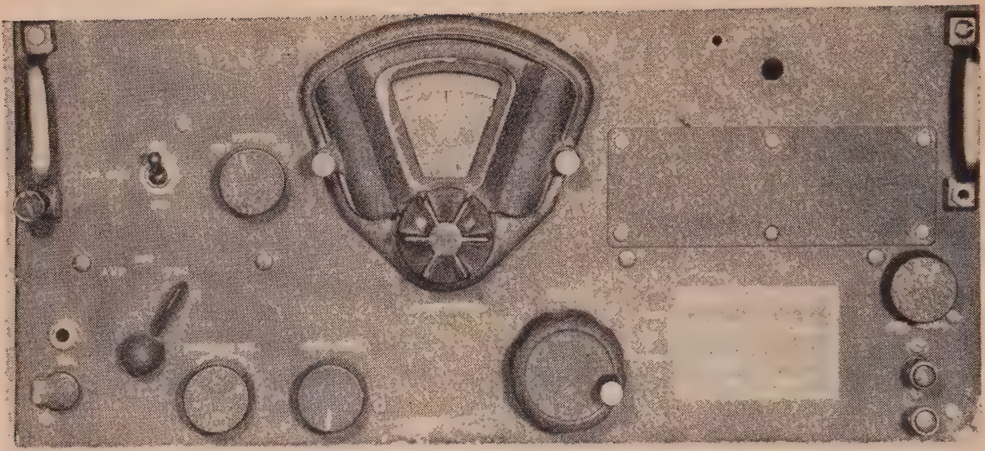


Fig. 5. A low-pass filter for harmonic suppression may be placed as illustrated here.



↓ Before

Suggestions on HOW TO

Here is a quick course in the glorification of ham equipment. You, too, can have your station out in plain sight and get away with it.

It is not surprising in the least that an overwhelming percentage of ham rigs are hidden away in attics, garages and basements. Without a doubt, this is true because an overwhelming percentage of ham rigs look exactly like something that *should* be hidden away in an attic, garage or basement. When an amateur decides to build a piece of radio gear, he is likely to be a perfectionist as far as its operation is concerned. He will spend long hours in building and tinkering until its performance meets his requirements. But, when it comes to the appearance of the thing, he is apt to give up in complete dismay. The general attitude seems to be that aside from sticking it in a crackle finish box, there's nothing you can do. It ain't necessarily so.

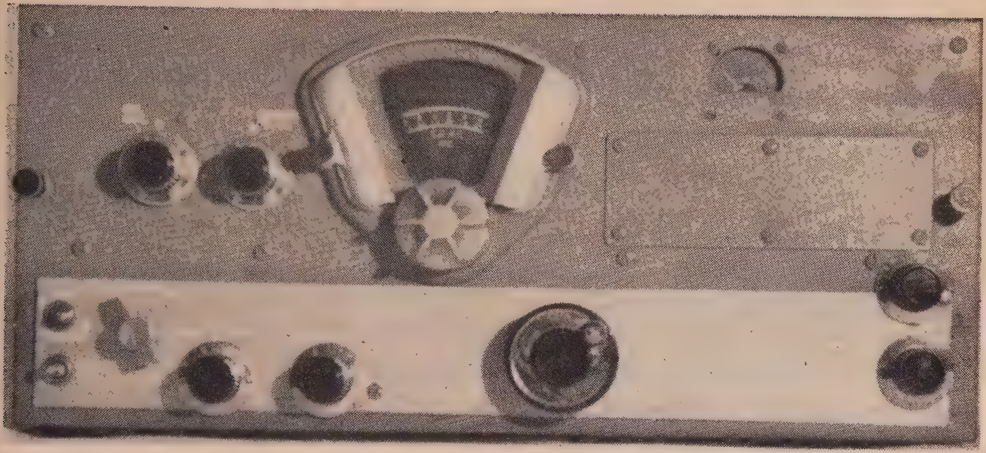
If you've watched the change in the look of manufactured gear since the war, and have observed some of the tricks used in dressing up amplifiers since the custom high-fidelity rash has hit, you've probably wondered if your rig couldn't be made to look like that. It can. There are plenty of things you can do, and most of them are simple and inexpensive in the bargain.

The photographs show a transmitter and a converted BC-348 receiver. While it is not claimed that these are of breath-taking beauty, they do look quite a bit better than they did in the original form. The BC-348 was worked over in a couple of hours time, as far as the appearance angle is concerned, but the result is enough to evoke some fine double-takes on the part of visiting hams. The process was simple enough. The handles were removed from the panel. The sides of the dial escutheon and the bandswitching knob were scraped down to the bare aluminum, satin polished, and heavily lacquered. A matching plate was put across the front, both for contrast and to cover the odd assortment of holes left when various controls were repositioned during the electrical conversion of the receiver. Rubber feet replaced the original base and the black crackle finish was covered with a coat of gray enamel. The control markings are decals and the knobs are the new *National HR* series. Aside from the knobs, the cost of the whole job was only a few cents.

The transmitter shown was another problem altogether. Here, rather than a face-lifting operation on already-existing gear, it was a matter of laying out the panel and the chassis to suit the appearance that was wanted. The works in the thing is a garden variety c.w. transmitter for 80 through 10. It was not necessary to build a freak in order to group the knobs as shown. They drive the shafts by means of shaft extensions and dial cords.

It is generally better to rig it that way than to try to jam everything together behind the knobs. It's true that dial cords have made quite a reputation for trouble, but keep in mind the fact that in home receivers—where the reputation started and thrives—the dial cord runs all over Giles County

After ↓



RESS UP YOUR STATION

CHARLES WELCH, W5MHK*

and a dozen pulleys; and instead of just connecting two pulleys, is expected to do everything but dim the house lights when the music starts. It is not surprising that they give trouble under such conditions. Keep the installation simple and they will give excellent service.

Make a careful scale drawing of the panel as you want it to look, then go over it carefully, considering all the possible troubles, before you start drilling and sawing. These have been examples of the two types of appearance treatments that you will have to cope with: new construction and restyling existing gear.

Painting

Manufacturers of radio equipment have finally discovered that there are colors other than the hearse black and coffin gray that were considered proper for so many years. Raytheon broadcast equipment is finished in two-tone brown; General Electric, in metallic blue; Sylvania test equipment looks good in green. While it isn't necessary to burst forth with a chartreuse and magenta VFO, it wouldn't hurt us to climb out of the black and gray rut in which we've bounced along through the years. A little thought will uncover a color combination that will suit you. Incidentally, it doesn't *have* to be a crackle finish, either. There is much to be said for the ruggedness of this finish, but there are other ways to do it. Automobile finishes get about the roughest treatment imaginable, and, with a few notable exceptions, the colors stand up remarkably well. Auto finishing methods, too, are excellent for use on radio gear if you have access to spraying equipment. Spraying equipment, by the way, can mean a fly spray gun if nothing more elaborate is available. When brushing paint over a crackle finish as was done on the BC-348, thin the paint so that it will flow on without filling the wrinkles or streaking. Of course everyone has heard of the auto body repairman's standby, masking tape. Don't forget it when the painting starts.

Aluminum

Aluminum is so easily worked and so readily available since the war, that it is almost ideally suited to radio work. The whole cabinet can be fabricated of it, or it can be used for trim only. It can be either painted or polished. To simulate the popular "Brushed Chrome" that is so popular today, polish the aluminum with fine sandpaper or steel wool using straight strokes. Finish with the finest grade available. As the metal will oxidize and turn dark on long contact with air, it must be given a heavy coat of clear lacquer immediately. The lacquer may be either sprayed or brushed on. If the metal is to be handled much, as in the bandswitch knob of the BC-348, many coats of lacquer must

---

* *1015½ Jenkins, Norman, Okla.*

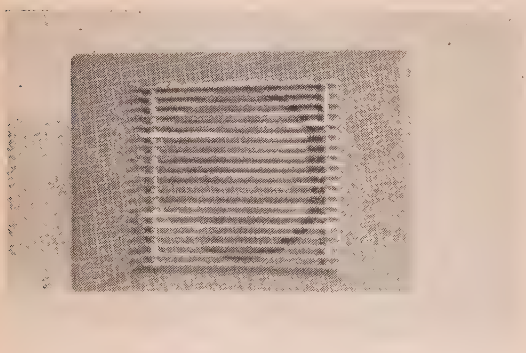
The parts layout in this little transmitter is quite conventional. Dial cord is used to permit the convenient layout of the panel controls.

be piled on until a very heavy layer is built up. Clear lacquer will not adhere to plain aluminum, so each coat should be lapped over onto the back of the part. Thus, the plastic shell formed by the drying lacquer will be anchored mechanically to the metal, thereby greatly increasing the life of the finish. Clear lacquer can be obtained in small quantities from model airplane shops.

Another finish for aluminum which is popular is the satin finish produced by soaking the panel in a water solution of lye. About four tablespoons to the gallon of water is the correct strength. Leave the metal in the solution for thirty or forty minutes. When it is removed from the solution it should be washed copiously with plain water. It, too, should have the clear lacquer treatment if it is to be handled very much. One caution: *Watch that lye!* It will eat eyes, hands, clothing, or just about anything else it can get a crack at.

Plastics

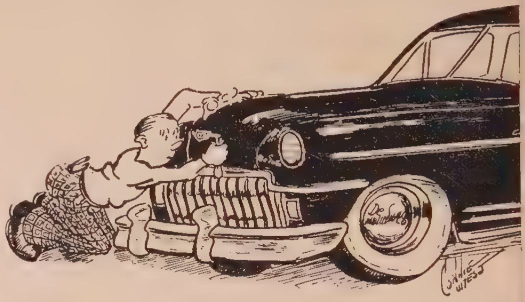
Plexiglas, and its cousins of other brand names, is another material which is very plentiful since the war, and it, too, is admirably suited to our requirements. It is very easy to work with ordinary tools, about the only thing to watch being to avoid scratching the polished surfaces. It makes fine dial escutcheons and the like. Paint applied to the back of the material gives the front a deep, rich, glossy color. A sheet of it painted a contrasting color, may be added to the panel to give it a very fine two-tone effect. By masking a design on the back and painting with the desired colors, the entire panel, bearing whatever design or trim you wanted, could be made out of a piece of the material. The deep richness of the finish possible with this material is truly surprising.



This fancy speaker grille cost a few minutes work and practically no cash.

Trim

Another great boon to amateur constructors is the decal panel marking. They work fine when treated and handled right, but when they are not treated right they can and have caused wails of disgust that must be clearly audible in ZL land on still days. The trouble seems to break down into one basic difficulty. Not being able to get the things off the paper in the first place. This trouble is caused by heat. One brand of decals, *Teckni-cal,* is put out in book form with waxed paper between each sheet of markings. Get the thing warm and the wax of the wax paper runs and does a bang up job of water proofing the sheet of paper that bears the decals. Naturally, they won't soak free in water, then. The solution is simple. Heat the water a little, and they come free easily.

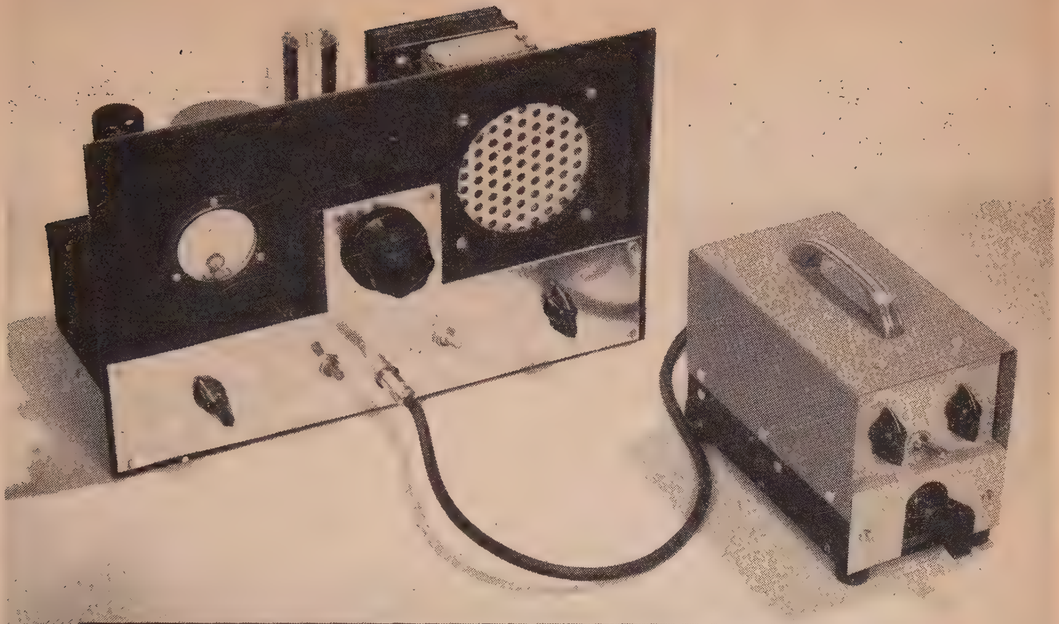


Most of us have seen and admired the tiny chrome emblems that manufacturers put on the panels of their equipment. It not only identifies the product of a certain company, but adds greatly to the appearance of the equipment. The amateur can do the same thing by mounting a lapel-pin bearing his call letters. The transmitter shown in the photograph uses such a pin. Use the type pin that has a screw back, rather than the safety pin type. Simply drill a hole in the panel, put the screw through, and run the nut down on the back.

The "Custom" nameplate shown on the transmitter should appeal more to the Hi-Fi constructors than to amateurs. It was wrenched from a '42 DeSoto in a burst of enthusiasm and installed on the panel of the transmitter. It can be bought from any Chrysler dealer for a dollar, or pried from the nearest DeSoto in the dead of night. Nash, too, uses such a plate.

Grilles

The speaker grille shown in the photograph was made of strips of aluminum. They were drilled at each end and stacked on two long bolts, with tubing spacers separating the strips. Since the aluminum strips must be straight and of uniform size, it is considerably easier and simpler to have them cut on a shear at the tinshop. The cost shouldn't be but a few cents.



TONE OPERATED KEYER

F. A. BARTLETT, W6OWP*

A novel electronic keyer for your c.w. rig.

THE USE OF VACUUM TUBES IN KEYING SYSTEMS has long enjoyed popularity both in amateur and commercial practice where exacting requirements must be met.

The most familiar v.t. keyer is the series negative lead arrangement which essentially applies electronics to center-tap or cathode keying. Of more recent design are the screen-grid systems using a combination of control tubes. This type of circuit is usually adapted to higher level transmitter stages.

In this article, the author describes a third type of electronic keying—the grid-blocking v.t. keyer. Essentially a low-level system if voltages are to be maintained at practical values, the grid-blocking v.t. keyer eliminates the presence of high blocking potentials—always a hazard with conventional grid-block systems—from the key circuit. At the same time, no loss of output occurs through the connection of the keyer to the stage which is to be keyed.

When built as a unit such as that shown in *Fig. 1,* above, several transmitter stages may be keyed simultaneously, or the single keyer can serve for more than one rig. The novel tone-operated feature permits keying either from the built-in oscillator or from an external singnal as, for example, a c.w. station tuned in on a receiver and fed to the keyer.

Keyed negative output is 300 volts, which is ample to block the average low-level buffer or doubler stage. Output resistance is 10,000 ohms. This permits simple connection to the keyed stage without change in its operating characteristics.

The Basic Concept

While the individual circuits making up the grid block v.t. keyer utilize familiar principles, the overall concept is new enough to warrant analysis before launching into a description of the unit shown in the photograph.

---

* *2210 Cipriani Bvld., Belmont, Calif.*

Grid block keying can be defined simply as the application and removal of a negative blocking voltage to the grid of the keyed stage in accordance with the opening and closing of a telegraph key. *Figure 2(a)* illustrates the basic idea. Negative voltage of sufficient amplitude to cut off plate current flow in V_1 is applied through the high resistance R_1. Keying is accomplished by grounding the circuit side of this resistance, thus dropping the applied voltage to zero. The resistance R and R_1 in combination with C provide lag for click control—with R also serving as a grid leak resistor while the stage is in operation.

This circuit is quite effective and capable of excellent keying. An important disadvantage, however, is the high blocking potential which appears directly across the key.

If the circuit be rearranged as in *Fig. 2(b)*, blocking voltage is secured in a different manner. Resistor R_1 of *Fig. 2(a)* is removed and resistance R is made the common bias supply load resistor and r.f. stage grid leak. The sending key is relocated in the bias supply so that in its open position current flows through R. The developed voltage cuts off V_1. With the key closed, current through R is cut off and the stage acts as a normal buffer-doubler with R serving as the grid resistor.

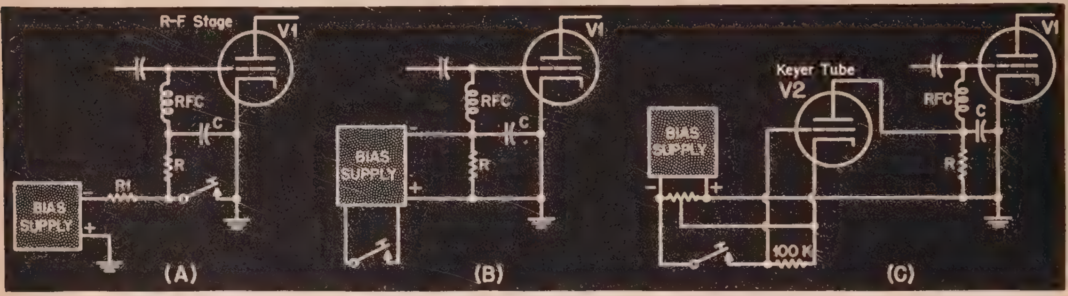


Fig. 2. The development of the electronic grid-block keyer.

A manner in which the theoretical outline of *Fig. 2(b)* may be carried out electronically is diagrammed in *Fig. 2(c)*. Here, V_2 controls the flow of current through resistance R in conformity with the operation of the key connected in its grid circuit. From a practical standpoint, this circuit offers no improvement over that of *Fig. 2(a)*. Key voltages are still high—plus the added disadvantage that neither side of the key is at ground potential.

Progressing backward? Not exactly. By the simple expedient of controlling V_2 by voltage from a signal rectifier and setting up a low potential circuit for keying the signal source feeding this rectifier, the vacuum tube grid-block keyer commences to assume a more practical appearance.

How this appears in block diagram form is shown in *Fig. 3*. The complete schematic is shown in *Fig. 4* with salient points being discussed in paragraphs to follow.

Oscillator/Limiter-Audio Section

Dual purpose of this "front end" is to provide both a tone source for local keying and an input circuit by means of which external c.w. signals can be used to key the transmitter for test purposes.

A switch selects the desired input which is connected through a conventional phone jack.

To provide the foregoing with a minimum of wiring detail, a straightforward Hartley-type audio oscillator is utilized. No particular effort was made to secure perfect waveform as this factor has no bearing on the keyed output voltage. The signal in the monitor speaker is quite satisfactory for operating position work.

Plate voltage is taken between the positive terminal of the power supply and a tap 30 volts down. By keying the positive lead—which is ground insofar as the transmitter is concerned—the problem of low key potential is effectively dispensed with.

Monitor volume is controlled by a 20,000-ohm potentiometer in the plate circuit. This gives a degree of oscillator tone variation as well.

When the input switch is in the "external tone" position, the grid circuit of the "oscillator" becomes a simple resistance coupled section and, due to low plate voltage, the stage operates as a triode limiter. A moderate range of signal input level can thus be accommodated.

To give adequate drive for the signal rectifier, a single stage of transformer-coupled audio follows the input stage. Input and amplifier functions are handled by a 6SN7 dual triode.

Signal Rectifier and Keyer

It is in this portion of the circuit that development and shaping of the keyed output voltage takes place.

Referring again to *Fig. 2(b)*, the condition required must provide for keyer output with key up—zero output with key down. Following through then, keyer tube plate current must cut off when tone is applied to the rectifier.

By wiring the half-wave rectifier as shown in *Fig. 4*, the grid of V_3 will see a negative voltage with respect to its cathode so long as signal input exists to the rectifier. If the constants specified on the schematic are followed, this voltage is sufficient to reduce the plate current drawn by V_3 to zero.

The signal rectifier is a 6J5 with plate and grid tied together. Its load resistor is ¼ megohm and a 0.1-µf capacitor serves to smooth audio variations. The developed voltage is fed through a second

¼-megohm resistor to the grid of V_3, a triode-connected 6L6.

The latter—which may be referred to as the keyer tube—draws plate current through load resistor R_2 and output voltage is taken across this resistance. A 0–50 milliammeter in the cathode checks for complete cutoff and serves to indicate proper keyer operation at all times.

Shaping of the rise and fall of the output voltage is accomplished by both inductive and capacitive-resistive means. The inductive lag serves primarily to smooth the "break" keying characteristic by retarding the sudden rise in current when the tone-generated bias is removed from the grid of V_3. The 20-henry choke in the plate circuit of V_3 supplies the needed amount of retard action. With this choke alone, a stage keyed by the voltage output of the unit should show a firm characteristic but little if any click.

To provide the more rounded shaping necessary where higher level transmitter stages "square up" the keying cycle, the condenser block following the ¼-megohm series grid resistor of V_3 gives a choice of 3 additional lag positions, each of which imparts a progressively greater degree of shaping to both the make and break characteristic.

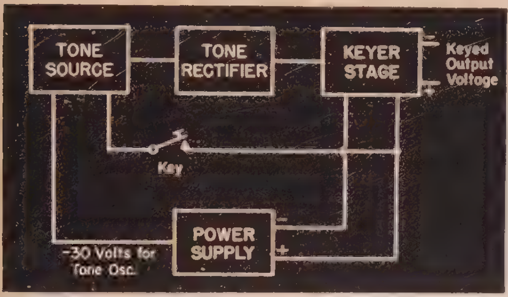


Fig. 3. The relative simplicity of the arrangement may be seen from this block diagram. The output is connected in series with the grid return of a low-level buffer or doubler stage to effect keying.

Power Supply and Wiring

Only a few points on this portion of the keyer require comment—but these points are important.

First of all, it must be kept in mind that the power supply for the keyer is also the bias supply for the transmitter stage being keyed. Thus, its positive terminal will be connected to transmitter ground. For obvious safety reasons both transmitter and keyer chassis should be maintained at the same potential. This requires a reversal of standard wiring practice—*positive* high voltage for the keyer stage is wired to the chassis. Consider it this way: *C* positive always connects to ground. And the keyer is the *C* supply.

The manner of securing the 30 volts for operating the oscillator/limiter is unorthodox, to say the least, but permits the end result of a key line which is safe to handle and has no unexpected voltage to ground lurking on either side.

The tap for the amplifier plate voltage is set for approximately 200 volts, the exact value not being critical.

Filament wiring is left floating because of the variation in cathode to negative potentials involved.

In view of the foregoing, care must be exercised in wiring a unit of this sort. It's not so easy to brush aside custom and the force of habit in keeping *negative* connections free from the "grounded" chassis.

Connection to Transmitter

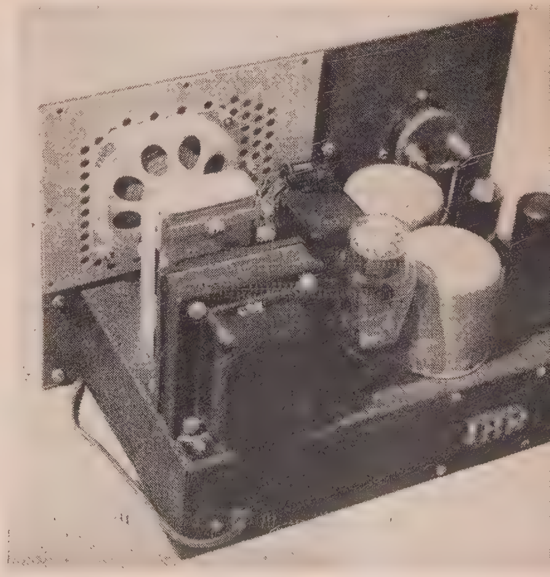
To connect the keyer to the transmitter, it is only necessary to open the grid return of the stage (or stages) to be keyed and connect it to the negative output terminal of the keyer. The positive terminal connects to the transmitter ground.

Opening of the gird return lead should, of course, be done at a point of zero r.f. potential. Even so, a .01-µf. bypass connected from the point of opening the return to cathode is a good idea. And, if TVI is a problem, an r.f. choke in series with the lead to the keyer is recommended. This should be installed within the r.f. stage chassis.

Operational Notes

As was stated in the opening paragraphs of this article, this v.t. keyer is designed for low-level keying; in other words, keying accomplished in the low power stages of a transmitter. A 6L6 buffer/doubler stage operating within manufacturers ratings typifies a practical example. Transmitter stages following the keyed stage should use fixed bias to hold plate current to cutoff when key is up. Operating bias beyond cutoff should be derived from a grid resistor of proper value.

With a line-up of this sort and assuming the



The chassis is 7″ × 12″ × 3″, while the panel is 9″ × 14″. The various components may be layed out any way you wish—this photo shows one straightforward arrangement.

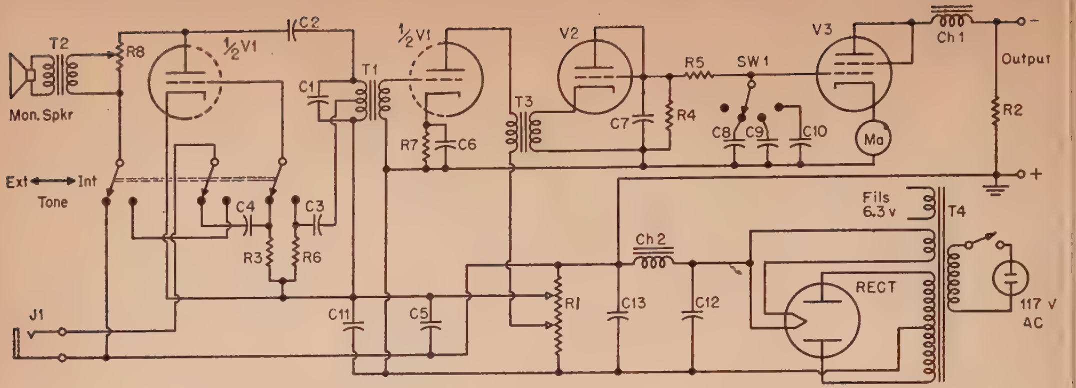


Fig. 4. Scematic diagram and parts list for the W6OWP grid blocking v.t. keyer.

R1—25 K, 100-watt bleeder with two sliding taps
R2—10 K, 50-watt
R3—¼-meg, ½-watt
R4—¼ meg, ½-watt
R5—¼-meg, ½-watt
R6—20 K, ½-watt
R7—2200 ohms, 1-watt
R8—20 K pot.
C1—C2—C3—.01 µf 600 v. paper
C4—C5—.1 µf 600 v. paper
C6—10 µf audio bypass
C7—.01 µf 600 v. paper
C8—.005 µf 600 v. paper
C9—.01 µf 600 v. paper
C10—.05 µf 600 v. paper
C11—.1 µf 600 v. paper
C12—4 µf 600 v.
C13—8 µf 450 v.
CH1—20-henry, 60 ma choke
CH2—30-henry filter choke
T1—Universal interstage P.P. audio transformer
T2—Universal output trans.
T3—Universal interstage 3:1 ratio audio trans.
T4—150 ma power transformer, 385 v. each side of center tap.
SW1—Single-pole, four-tap wafer switch.
Tone Switch—triple-pole double-throw wafer.
J1—Standard Phone Jack
V1—6SN7
V2—6J5
V3—6L6
Rect.—5U4G
MA—0-50 milliammeter

---

stages are free from parasitics, good solid keying with no trace of clicks is a reality. This means being able to listen to the signal on an average communications receiver operated adjacent to the transmitter and hear no evidence of keying until the carrier is actually tuned in.

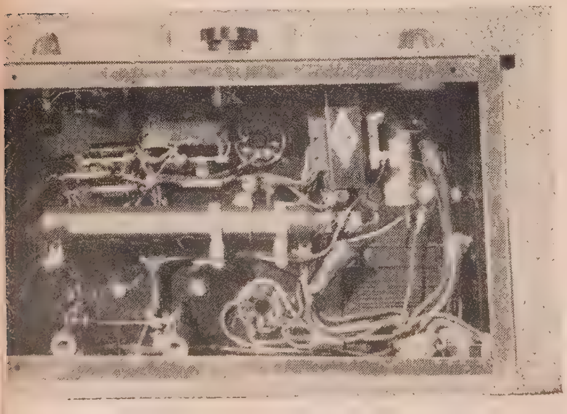
The reader will note that no mention has been made of using the grid-block v.t. keyer for oscillator keying. This does not imply an inability to function in this capacity. As a matter of fact, the circuit will work as well as or better than most systems. However, elimination of the oscillation start and stop clicks is not a keyer function as these clicks are inherent in keyed oscillator output. Since the potential required to grid block an oscillator is relatively low, a simpler solution than the unit described can readily be arrived at.

Where more than one transmitter stage is keyed, some lack of uniformity in rise and fall of the shaping characteristic may be encountered. This is due to different cutoff points for the stages keyed. Adjustment of the r.f. drive to each stage usually will bring about the required linearity.

The final quality of the transmitted signals will depend on factors other than type of keying system employed. Of paramount importance is the stability of the VFO or frequency control stage. It is surprising how many of the weird-sounding signals heard these days can be traced to nothing more than keying reaction on the oscillator. A rock-stable VFO should be the Number 1 aim of every operator striving for a top quality c.w. signal.

Other points enter into the picture, of course. Freedom from parasitics has already been spoken of. Good voltage regulation is important, as is also the amount of power supply filtering. A correct ratio of fixed-to-developed-bias in high power stages helps to prevent undue sharpening of an otherwise excellent shaping chaarcteristic.

It wasn't intended that this article be a treatise on the whole subject of keying. Suffice to say that, given proper treatment, the grid-block v.t. keyer will do a professional job of keying control with a degree of versatility at once welcome to the c.w. operator.



Wiring is simple, with all leads run in the most convenient manner. Since there is no r.f. involved, the builder has few problems.

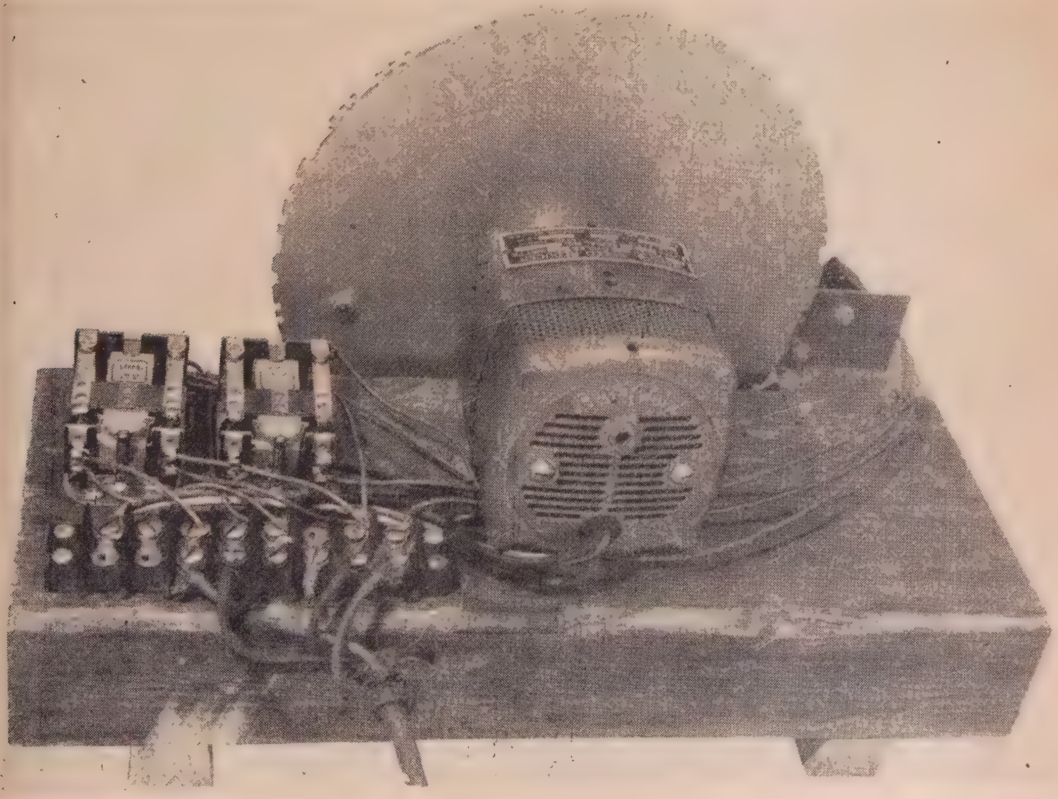
The CONTEST MACHINE

M. E. HIEHLE*

A CHECK ON PAST ACTIVITY DURING THE SS showed that out of the forty hours of operating time, some ten hours was used in calling CQ. The question is: Why use all the wrist oil when a good tape machine will mechanize the station? The answer is, you don't. Having previously used an automatic sender with paper tape, it was decided to try some other method. While a tape machine has many advantages, it is not too suitable for long repetitive use due to the fragile nature of the paper tapes. Several possibilities were investigated including notches cut in a disk, wire and phonograph recordings, and conductive material on an insulated drum. The disk type was chosen for simple construction and lending itself to automatic turn off. Moreover, it would be almost foolproof and with small chance for failure.

The disk type automatic machine consists merely of a metal or plastic disk around whose periphery the desired code is cut. A contact is made either directly with the disk or through some mechanical switch. The cut, below, shows the resulting machine built. Not content with just a plain CQer, this machine has stops and is adjusted to sign off the call, and to reset for the next call. The disk is made of 3/16 inch aluminum and is 10½ inches in diameter. Keying contact is made by riding the spring leaf of a microswitch directly on the notched disk. This method of indirect contact prevents burning or arcing on the wheel. Further, the microswitch allows considerable power to be controlled. However the life of the microswitch snap spring is limited.

Three types of switches are available depending upon contact springs: .008, .020, or .070 inch spac-



---

* Culver City, Calif.

ing. The closer the spacing, the longer life expectancy The manufacturer's ratings are shown below:

Spacing in inches	Switch Operations	Hours of operation
.008	45,000,000	572
.020	20,000,000	260
.070	500,000	6.6

The hours of operation are based on 25 wpm. Thus with a 20 mil spacing, we can expect to use the switch for 260 hours.

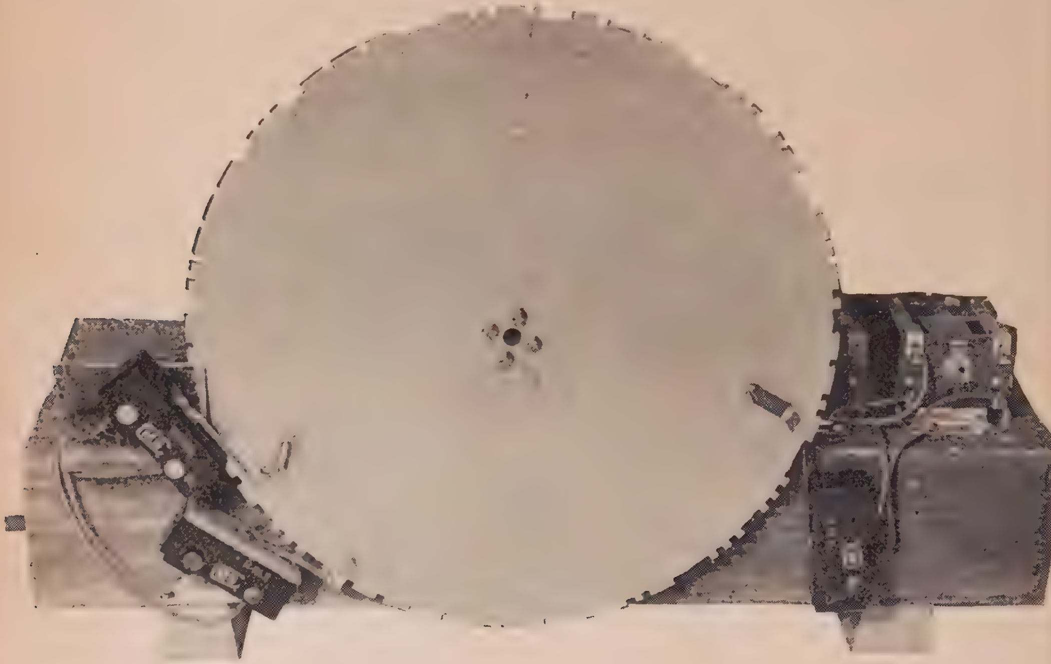


Fig. 1. The mounting of the three microswitches and the method of securing the disc to the drive shaft can be observed in this view.

To determine the speed of the drive motor and the size of the disk, it is necessary to analyze the message. Perfect code is made up of fundamental time units called bauds, which are as follows:

a dot = 1 baud
a dash = 3 bauds
space between dots and dashes of one letter = 1 baud
space between letters = 3 bauds
space between words = 5 bauds

A standard word, when speaking of words per minute, consists of 48 bauds. Perhaps you have heard commercial stations sending the word PARIS over and over. This letter group is 48 bauds long and therefore, represents exactly one word. In my case, it was decided to send;

CQ SS CQ SS DE W2SO W2SO which is 268 bauds, or $\frac{268}{48}$ = 5.6 words. For 25 wpm, a motor having $\frac{25}{5.6}$ or 4½ rpm is required. In order not to have too small notches in the wheel, ⅛ inch was allowed per baud. This gives a wheel diameter

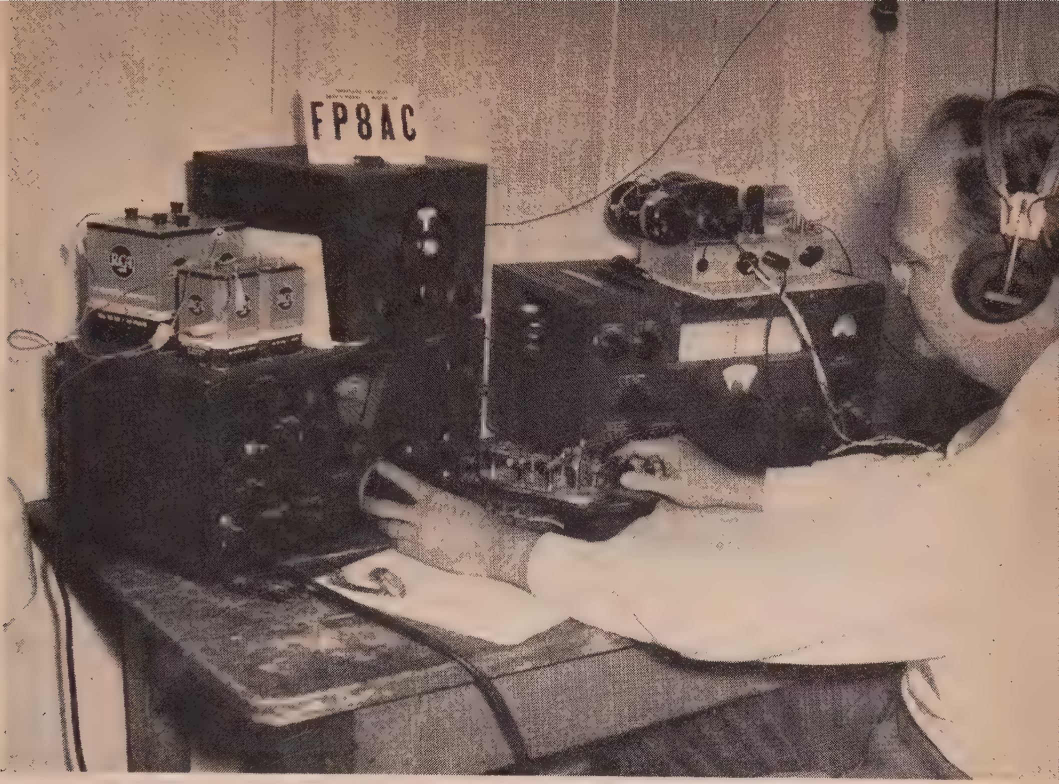
$$\text{Diameter} = \frac{\text{Bauds} \times \text{Length of Baud}}{\pi}$$

$$= \frac{268 \times \frac{1}{8}}{\pi} = 10.65 \text{ inches}$$

Using a pair of dividers, a circle, ⅛ inch from the outer edge was marked on the disk to define the depth of cut. Next the 268 bauds were laid out on the periphery and then, using a small square, the proper marks for the letters were drawn on the side of the disk. The disk was now notched using a small jig saw, this process taking about an hour. No file work was found necessary, since using an eighth inch per baud eliminated the need for extremely square edges. The accuracy of the work could also be held without undue trouble or care. To mount the disk to the motor, a small collar one inch in diameter and one inch long is bolted to the center of the disk with three 6-32 screws. See *Fig. 1.* Care must be taken that the alignment is good, otherwise, there will be skips in the keying. Two set screws in the collar hold the disk assembly on the quarter-inch motor shaft. The drive motor is Barcol 31 watt with built-in gear box to give 4½ rpm shaft speed. During operation, the disk rings as the microswitch leaf slaps on the edge; therefore the assembly was mounted on rubber and in a box for soundproofing.

Two relays can be seen in *Fig. 1,* and are used to provide automatic sign off and reset. The sign off feature is provided by using the initial—·—

(Continued on page 67)



The SAGA of FP8AC

WILLIAM I. ORR, W6SAI/FP8AC*

"THERE REALLY ARE THREE ISLANDS—St. Pierre, Miquelon, and Langlade, although most people have never heard of the third island."

The speaker was a Frenchman, standing next to me on the bridge of the *M/V Miquelon.* He braced himself against the heavy roll of the ship, and pointing out into the black void that enveloped the vessel said, "We are passing between Langlade and St. Pierre Island now. Too bad it is so dark. Langlade is a lovely spot."

Perhaps so, but I doubted it at the moment. The *Miquelon* was rolling violently in a rough sea, and a stinging wind was blowing icy salt water thru every tiny crack of the storm windows. Absolutely nothing was visible beyond the confines of the bridge. Behind me, the door to the radio room was ajar and I could hear bursts of the heavy North Atlantic ship traffic on 600 meters coming from the operator's headphones. I sighed to myself and wondered what insane desire had prompted me to make this mad trip into nowhere, just to operate an amaeur radio station. A vision of W6SAI adrift in a leaky lifeboat in the stormy sea rose in front of me and I wallowed in a morbid dream of self pity.

The Frenchman gestured to me, "Come! See our approach to St. Pierre on the radar screen." Sure enough, just inside the radar's mile marker appeared the fluorescent image of St. Pierre. "See, there is the harbor! We are only minutes away. Cheer up, mon ami, you could probably swim the remaining distance, if it were necessary." Knowing the trip was practically over restored my sense of equilibrium, and thought of the leaky lifeboat vanished. I took a last look at the radar screen and hurried below to collect all my gear for the immediate landing.

* * *

FP8AC commenced operation from the top floor of the Hotel Robert at 1130 ADST, on the morning of July 7, 1950. It was truly an exciting experience. We arrived at the hotel late the night before and tumbled into bed immediately. When we awoke the sun was pouring in the window and we could hear the sounds of the island floating up to us. While Sunny (my XYL) went out to have breakfast and explore the island I decided to waste no time getting on the air. The equipment was set up on an old writing desk and a 14-mc doublet was attached to the hotel flagpole and run out to a crossarm on a crumbling telephone pole directly across the street. The transmitter consisted of 12A6 crystal oscillator, and a 12A6 doubler, running 15 watts input. The power supply was two "274N" receiver dynamotors, connected so as to provide 500 volts at 70 ma. The unit was designed to operate from 32 volts d.c. The receiver was a battery operated SW-3 of ancient vintage. For 110-volt evening operation, a BC-348 and a Collins 310B exciter were available.

---

* *555 Crestline Dr., Los Angeles, Cal.*

"Stand back, boys, here we come," I said to myself as I threw the power switch and sent "CQ CQ CQ CQ DE FP8AC FP8AC. . . ."

* * *

The islands of St. Pierre, Miquelon and Langlade are the last outposts of the once great French Empire on the North American continent. They are located only a few miles off the South coast of Newfoundland, which may be seen from the town of St. Pierre on a clear day. Their total area is about 90 square miles. The largest town in the islands is St. Pierre, the main port, with about 3500 population. The main industry of the islands is fishing, and St. Pierre is a fisherman's town. The houses are of typical French design and made of wood and clapboard siding, with only a few brick or masonry buildings scattered throughout the town.

The main building on the Quai de la Roncière contains the custom house, radio station, and post office. The upper floor of this building is devoted to the receiving station, which uses two HROs, a NC-200 and several receivers of British and French design.

Atop the hills overlooking the town is the remotely controlled transmitting station, FPN. It is a modern station, complete to the huge gasoline driven generators for primary power. Tucked away in one corner of FPN is a tiny broadcast station, operating on 570 kc. It comprises a huge, octopus-like tube as an oscillator, and a twin tube as a modulator. It is used to broadcast news and music for a few hours in the evening. Looking from the front door of the station, one can see over the whole town of St. Pierre.

The soil of St. Pierre is a rocky variety of muskeg and few trees grow on the island, except for a species of runt pine about three feet high. A few roads criss-cross the island, running out to the lighthouse at the point and to the fishing village of Savoyard at the southern tip of the island.

The two islands of Miquelon and Langlade possess a more inviting landscape than does St. Pierre. They have less fog than St. Pierre does, and they have small "forests" of trees. The two islands are connected together by a long, low sand dune that holds the wreckage of ships that have foundered upon it during the many storms that sweep the islands. There is no electric power available on these islands, and the only radio gear is a small low frequency transmitter run by batteries for communication with St. Pierre.

During the time when "the band was dead" we spent much time roaming over the island, exploring the old plants and warehouses set up during prohibition days for the shipping and storage of "le whiskey." The period of prohibition in the United States brought glittering prosperity to the islands which had been in the throes of a depression caused by the decline of the fishing industry. Profits from the liquor trade were put back into giant warehouses, and fishing boats were discarded in favor of larger cargo ships. With the repeal of prohibition, the boom collapsed and the islands slumped back into depression. Many of the inhabitants have migrated to Canada and the United States. A ghostly relic of the "old days" is the accumulation of empty warehouses and rusting machinery that line the waterfront about the town.

The climate of the islands is harsh. Winter, although not very cold (average of 10°F) is long, and the spring flowers do not appear until July. The fall winds start to blow during the month of September.

All these facts fade into oblivion when the hospitality of the islanders is considered. All the Americans on the island (5) were unanamous in voicing the opinion that they had never met such hospitality in any other foreign land. Truly, the hearts of the St. Perrais are made of gold! We made fine friends during our brief stay, and when the time came to depart, both Sunny and I felt that the warm friendships made would remain with us forever.

* * *

The operation of a rare DX station in a hitherto "hamless" country is a favorite dream of all DX men. This dream came true for W6SAI on July 7th, when FP8AC announced to the world that he was open for business. The first CQ, however, was a dismal flop, as it brought no replies at all! A second CQ was more successful when W2NSZ replied and made history with the first legitimate 14-mc FP/W QSO. He was followed rapidly by W9VV/8, W1LVH, W2QKZ, FA3VV, G3DER and HB9J. The news of FP8AC spread like wildfire, and in a few moments time a full-fledged pile-up had appeared from nowhere, with FP8AC and his 7-watt carrier buried at the bottom of it.

The famous "DX effect" was immediately apparent. Before I left sunny California, I had hooked my little rig to my beam and called 18 CQs with no luck. Now, here was the same rig, same operator, with only a measly doublet antenna hung on an ancient telephone pole, pulling in S8 and S9 reports! Stations that had rudely trod on the 7-watt W6SAI and despised him were now madly cranking up their Variacs and making his life miserable! By the time the dinner bell rang I was furiously scribbling in the fourth page of the log book. After dinner, I moved to 14,400 kc to keep the schedules I had previously set up with KV4AA, WØSQO, and W6ADP. The idea had been to work stations on a rotating schedule at the "high end" of the band to avoid the pile-ups and QRM encountered on the low frequency end of the band. Alas! The idea died a quick death. Before I even turned on the transmitter, I heard a few stations giving exploratory calls to FP8AC on 14,400 kc. When I fired up and called KV4AA the whole band dropped on me! The schedule list was finally obtained from KV4AA,

(Continued on page 60)

The MARS Page

THE GENESIS OF A LADY MARTIAN

THE INVASION OF MARS AND HAM RADIO by officers' wives may in the future affect military protocol with the seating at social functions being based on WAZ standings or MARS criteria of excellence.

The desertion of bridge and canasta tables by Merle of W9KRG, the wife of Major General John F. McBlain, Commanding General of Scott Air Force Base, for MARS and ham radio may set a precedent for other officers' wives to follow as well as change the entire pattern of conversation from, "Wasn't that a frowzy frock that Gertie Geschundeit wore at the dance Saturday night?" to "How's DX, Mable?"

Merle's addiction began in all innocent curiosity at a dinner party given by Lt. General Curtis Lemay at Weisbaden, Germany, back in 1948. Right in the middle of dinner Curt, with his ear cocked toward the ham shack (he was D4AFE, you remember), bolted the table in answer to a voice coming from the loudspeaker and did not come back for some time. Begging his guests' pardon, he explained that he was talking to W3HN, in Washington, D. C.

No. It wasn't a code name for a secret mission, or official gobbledygook. It was amateur radio. Would any one like to see?

Mrs. McBlain would like to see.

Hmmmmmmmmm. How cute.

"Just twist this little knob and hear all those people talking."

"Are they all in the United States?"

"Well, then, how is one to know where all of them are?"

"Prefixes?"

"What are those?"

"Oh! I see. I see."

"Really, isn't it wonderful? All over the world."

The mike came just naturally. And after Merle decided that life wouldn't be complete without a rig of her own, the key came tediously. She enrolled in code school and stayed with it every day until on the verge of dit-dah happiness. In a month she had topped 13 words per minute. She memorized circuit diagrams, boned on fundamentals and came through the military amateur examination with flying colors.

With the coveted ticket, D4APO, tacked on the wall she began to learn the gentle art of scrounging and with the help of most of the active hams in Weisbaden she collected sufficient junk for 10-meter

(Continued on page 57)

Class A modulation with a pair of 304THs eliminates the costly modulation transformer and keeps things simple.

A low cost MODULATOR for the KW FINAL

M. H. KRONENBERG, W2IJU*

As everyone knows, you don't get anything for nothing, but an old-fashioned circuit used on a couple of inexpensive surplus 304THs provided the writer with a high-power modulator at a very low price. This circuit you will agree, is a way to get a lot for practically nothing.

Actually the idea for a low cost high-power modulator suggested itself when the writer obtained a few 304THs for a few dollars each. Not because of any immediate need, but here was 600 watts of plate dissipation for less than $5.00.

Due to the high plate dissipation of the 304TH, it was decided to try the old Heising modulation system to obtain a few hundred watts of audio. At first this idea was rejected because of the low efficiency normally expected from such a system. However, investigation into Class A power amplifier design showed that if a little distortion can be tolerated it is possible to design a Class A, single-ended modulator which will be about 45% efficient during periods of excitation. Another reason for the attractiveness of the Heising modulator idea was the possibility of using an ordinary filter choke in place of a relatively expensive modulation trans-

---

* *82-27 217 St., Queens Village, N.Y.*

TABLE I

FINAL AMPLIFIER	Mod. Load Impedance	Mod. Bias	Max. RMS Grid Volts	Approx. Mod. Plate Current	Max. Audio Power Output	Max. Mod. %
3000 V @ 300 ma	10,000 ohms	145 V	100 V	250 ma.	325	85
2500 V @ 320 ma	8,000 ohms	120 V	84 V	225 ma.	280	85
2000 V @ 270 ma	7,000 ohms	100 V	70 V	175 ma.	180	85

former, also the small driving requirements.

The first step was to consult the manufacturer's specifications and static curves, select correct bias values and determine driving requirements. The design was at first intended for a transmitter whose final amplifier is normally run at about 3000 v. at 330 ma. However, since many hams may be interested in applying the same system to their own transmitters a table showing modulator design parameters for various other plate voltage-current combinations is included. The bias is rather critical because in each case the modulator is adjusted for maximum possible output for a given load impedance and distortion.

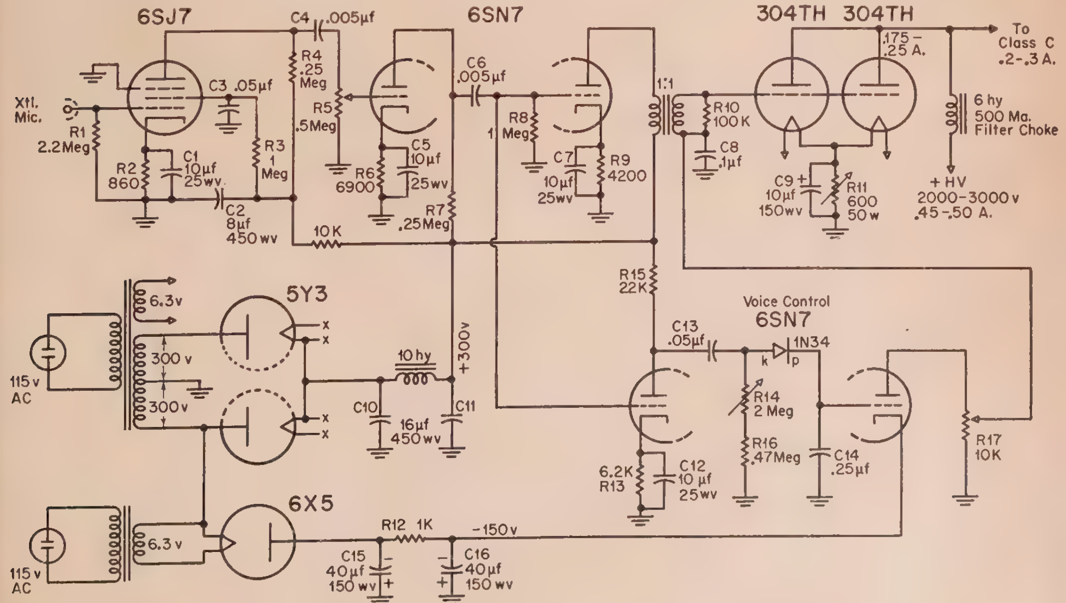
After design of the modulator was completed on paper certain problems which weren't apparent at first presented themselves. One was the problem of providing filament power for a pair of 304THs which amounts to about 5 volts at 50 amps., or 10 volts at 25 amps. Fortunately it was found that a few different types of transformers which would fill the bill were obtainable at reasonable prices. For example, the writer was able to obtain two 5-volt 25-amp transformers for about five dollars in the surplus market.

One more serious problem of design appeared to be the fact that during periods when no excitation is applied to the modulator, the tubes dissipate about 600 watts which is not only enough to heat up the shack but is very wasteful. A simple control circuit was devised to reduce automatically the modulator plate current nearly to zero during pauses in speech. The circuit is designed so that the modulator turns on the instant speech starts and remains on for about two seconds after speech ceases. This insures that speech will not be cut short and yet reduces the duty cycle of the modulator so that it is always working at nearly maximum efficiency. It is also possible with this system to dispense with one of the 304THs although a single one in the same place will, for short periods, be exceeding its maximum dissipation.

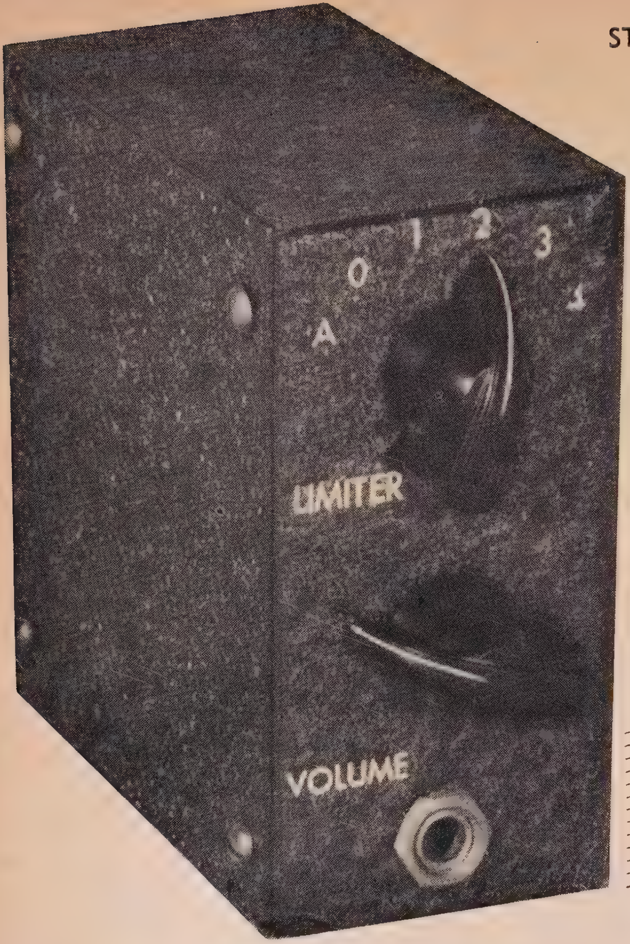
The resulting circuit consists of a simple resistance-coupled amplifier, transformer coupled to the grids of the 304THs with an ordinary interstage audio transformer. The output choke, in the case of the writer, was stolen from the two-section filter of the final amplifier plate supply, as it was found that a single section filter provided a sufficiently hum-free carrier.

Reference to *Table 1* will show that the modulator working under various conditions of load impedance is not quite capable of producing 100% modulation. In order to show the fallacy of this requirement, *Table 2* shows modulator power requirements *vs.* % modulation. As can be seen, a reduction of modulator power to 300 watts only drops the modulation percentage to 75%, still a well-modulated carrier. The reason for this is that

(Continued on page 69)



STEPHEN LEIBHOLZ, W2ZDE*



℞ for PAINLESS

“SURE, OM, WE HAVE FULL BREAKIN HERE. Just press the key and we're on the air. . . .” No doubt he has all the facilities for breakin, but can you actually break in on his transmission for a question or comment? Chances are that the answer is no. Chances are that he has cut the receiver gain down while transmitting so that his own signal won't sound like a rivet gun against his skull.

Why work breakin? Breakin is legalized “duplex” operation. The difference between a c.w. breakin QSO and an ordinary one is the difference between using the telephone and writing letters. A breakin QSO is a conversation; a back-and-forth QSO is a series of speeches. We could elaborate on this, but you probably get the idea: Go breakin, young man!

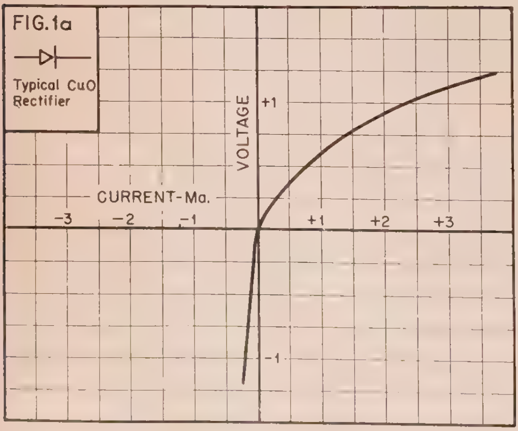


FIG.1a

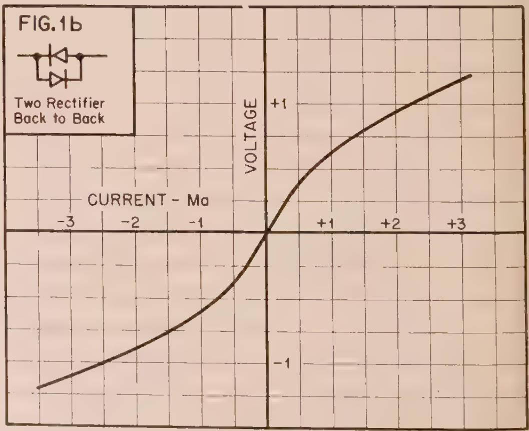


FIG.1b

---

* *54–55 69th Lane, Maspeth, N. Y.*

BREAKIN OPERATION

Probably the biggest reason why more c.w. operators don't use real breakin is the survival instinct. The human head has only two ears operating in push-pull, and no replacements are available. Ergo, the choice is between the rivet-gun effect and no breakin, and usually the latter wins out. However, if we could make our own signal sound as loud as that of the other fellow, and eliminate the clicks in the headphones, we could leave the receiver wide open for full breakin and operate in comfort.

What we need is some sort of instantaneous AVC which prevents the headphones from putting out more than the ears can take in—a limiter. For various and sundry reasons, the AVC or ANL found in most receivers will not do this job. One solution is an audio limiter, preferably hooked right at the headphone terminals.

It was with this in mind that the well-known crystal-diode clipper was developed. Using two 1N34 crystals biased by two batteries, this device essentially clips the tops off incoming signals when their amplitude is louder than some predetermined value. It is a pretty good job; we used one for about a year. But the clipper had two disadvantages which we didn't like, first, the messiness of mounting and soldering to flashlight cells, and second that this type of clipper is too positive, it is practically a square wave generator and heavily *clipped* signals, especially when there is static interference present, tend to take on a "mushy" sound.

As you know, a dry-disc rectifier such as a copper-oxide rectifier is not a perfect insulator in one direction and a perfect conductor in the other. If we take a typical rectifier and draw a graph of applied voltage vs. current, we get a curve something like that of *Fig. 1a.* On one side the curve is very sharply downward. This is the reverse direction, when little current flows. However on the other side, when the rectifier is conducting, notice that as the current through the rectifier increases, the voltage drop across it does not keep pace; in other words the voltage across the rectifier tends to approach a limit. Suppose we connect two rectifiers in parallel, but so that the positive side of one is connected to the negative side of the other. This unit will always conduct a current . . . it won't rectify . . . but its characteristic curve will look something like *Fig. 1b.* If the voltage is an audio voltage, then, it will get *limited* in value. Here is the gimmick behind the limiter we're discussing.

The limiter circuit was designed so that you can choose different levels of clipping. Normally a single pair of reverse-paralleled rectifiers clips too heavily for ordinary use, so that two of these in series are normally called for. We can make up this non-rectifying rectifier circuit very nicely from a bridge rectifier, by shorting the d.c. output leads together, getting exactly what we want.

The limiter was designed around a miniature meter rectifier such as the *Conant* type B. However a little scrounging around indicated that we could get a perfect substitute in war surplus. A miniature bridge-selenium rectifier was found, about $\frac{1}{2}$ inch thick and $1\frac{1}{4}$ long, rated as "117 volts 40 ma.," in two parts houses in New York City, selling for a lot less than what a new Conant rectifier would cost.[1] We built our limiter with the surplus unit, and found it just as desired.

The rest of the circuit of this limiter is almost pathetically simple. Switch S_1 *(Fig. 2)* has six positions, reading clockwise (c.c.w. on the diagram) *"A, O, 1, 2, 3, 4."* Position *O* cuts the limiter out. Positions *1* through *4* give increasing amounts of limiting, although the volume stays constant. This is done by selecting one of two taps on the voltage divider made up of R_1, R_2, and R_3, and by taking either one section or all of the limiter-rectifier. Position *A* leaves the limiter out, but connects the

(Continued on page 66)

---

[1] *TAB* Radio, 6 Church St., New York 8, N. Y. *World Wide Comm. Equip.*, 88 Cortlandt St., N. Y., N. Y.

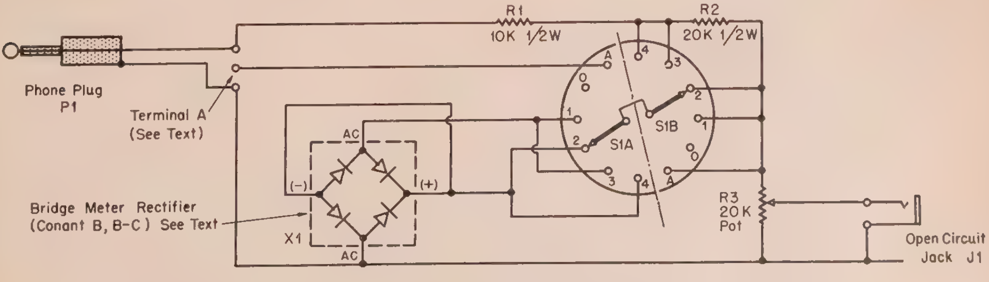
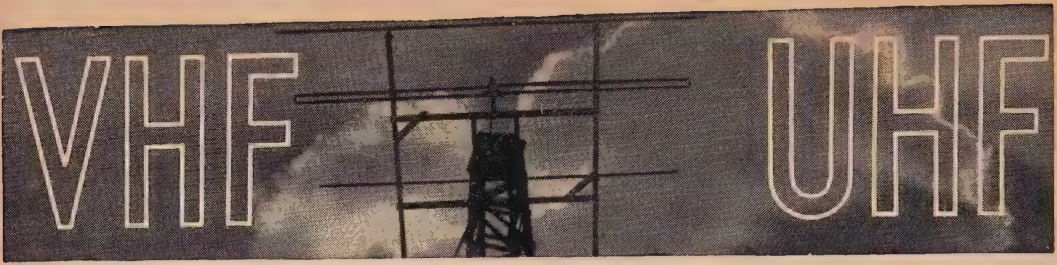


Fig. 2. The wiring diagram of the limiter. No bias battery is used.



Conducted by E. M. BROWN, W2PAU*

The closing days of July and the month of August, 1950, will be remembered by the two-meter gang as one of the best DX seasons we have yet encountered. Although this is supposed to be the time when weather conditions should be optimum for long-range two-meter work, reports of ground-wave DX, however outstanding, have been pushed into the background by the sudden outburst of two-meter aurora activity. There have been repeated band openings of a type that could hardly be caused by anything but aurora, and they have been of sufficient duration and intensity to demonstrate beyond a doubt that our two-meter band can be used to effect useful two-way communications over great distances by means of reflections from the Northern Lights.

The six-meter band has shown a few signs of life, but after the tremendous activity of the previous months, anything is bound to seem like a let-down. The peak of the 1950 sporadic-E season seems to have passed, but there is still the possibility of an unscheduled break. The very unpredictability of these six-meter openings is one of the chief attractions of the band for its devotees. The aurora effects which have awakened the two-meter band have been felt to an equal extent on six. But this is old stuff to most of the six-meter gang. It is surprising how many of the confirmed 50-mc operators are showing up on 144 mc during these openings.

At the time of this writing, we have heard no reports of exceptional work on the higher bands during the past month. The u.h.f. workers are continuing their efforts, but the big breaks are yet to come. Most of the accomplishments which were news in days past are mere routine work now. For example, W2QED, of Seabrook, N. J., has worked W3OWW on 435 mc no less than 25 times to date. A few weeks ago, establishment of contact over this 85-mile hop was big news. The northern and southern ends of New Jersey have been linked on 420 repeatedly. W4HHK and W4BYN have succeeded in seting up a two-way link on 420—they found the 20-mile hop much easier to cover than they had expected. W4HHK reports that several stations in the Memphis area, including W4DIX, W4FGG, W4VT, and W4CV are getting set up for 420. Most of these boys are starting out with crystal-controlled rigs and stable, narrow-band receivers. W7QLZ, W7FGG, and W7KWO are continuing their mobile experiments with encouraging results. They have experienced S9-signals at close to 100-mile DX from favorable locations. They state that the signals on 435 mc average better than the two-meter signals. Yep, there should be a big increase in 420-mc activity during the coming months. . . .

LATE BULLETIN

The first XE2 to W6 two-meter QSO was made on August 24 at 9:31 p.m. PDST when XE2FW raised W6YOZ on a CQ. Subsequently, the following stations were also worked: K6BV, W6s: EJL, EIR, GTZ, GWO, CSG, BHG, ZEM and WNN. The band opening lasted for about an hour. XE2FW was running about 10 watts to a 522, with a 4-element array. The DX involved was about 150 miles—not bad for the rugged terrain of southern California. At last the barrier has been broken, and the border of California has been crossed by two-meter signals! This is only the beginning. . . .

July 24th: A wide-spread aurora opening found quite a few of the gang on deck. W8RWW reported W1HDQ, W1IZY, W1OOP and others. He worked W1HDQ for what was probably the first Michigan-Connecticut contact on 144. Al gripes about the many strong phone signals which could not be copied due to the aurora effect. . . . W1IZY hooked W8WXV, crossed-polarized. Lest some of the more optimistic brethren jump to the conclusion that polarization is unimportant during an aurora, listen to what W1IZY has to add: "The low end of the band was filled with weak c.w. signals on my vertical (12-elements—a lazy-H with

FLASH

During the evening of September 6th, 1950, favorable weather conditions produced a wide-spread two-meter band opening across the north-eastern United States. W2BAV, of Claryville, New York, worked 29 W9s, 10 W8s, and 5 W0s. His best DX was W0DSR of Greenleaf, Kansas, approximately 1175 miles. This contact practically ties the existing two-meter DX record.

---

* *Associate Editor, CQ. Send contributions to: E. M. Brown, 88 Emerald Avenue, Westmont, Collingswood 7, N. J.*

reflectors and directors). When the horizontal antenna, (a five-element parasitic which had been kicking around the shack) was put up about 30 feet and hooked to the receiver, they all came pouring through." Jack concludes that, as on five-meters in the *old* aurora days, polarization does hold. Cross-polarization work is not impossible, *but it is difficult.*

Also on deck during this session were, W3KWL, W8WRN, W9EHX, W9HXU and W9UCH.

July 30: Good tropospheric conditions prevailed in the northeast. VE1QY of Yarmouth, Nova Scotia, was heard and worked by several stations down the coast, the most distant being W4CLY at Cape Henry, Va. Bill and Jerry are to be congratulated for a fine achievement—a 709-mile QSO is DX in any part of the country. The polarization . . . horizontal!

August 1: W4HHK reports a QSO with W4KIP, Atlanta, Ga., for Paul's 14th state. W5JTI of Jackson, Miss., was also on deck and worked about the same stations as W4HHK. Other new stations for these two rivals included W4FIG and W4FSW, of Birmingham, and W5BEV, of Columbus, Mississippi. W4HHK and W5JTI were not stuck on state #13 for long! . . . This might have been another case where the opening that VE1QY and W4CLY experienced stretched down to the southern states. How long will it be before both ends of this path are linked by a single set of good conditions?

August 2: A good opening occurred between New Orleans and Beaumont during which W5s EM, MXJ, AOA, OZQ found W5s DSB, AVW, QME, QIO, and FEK on the Texas end. While on the subject of Texas activity it might be well to mention the Convention at San Antonio. From all reports it was a dandy, with the v.h.f. hams very much in

August 7: An early evening outburst of aurora proved to some of us that it doesn't always pay to take a nap in the early evening so as to be alert when the gang starts activating the band after TV hours! Starting around 8 p.m. EDST, this opening was all over before 10 p.m. But it was a busy session while it lasted. W4AO, of Falls Church, Va., was the star of this affair. With his 600 watts into a 32-element beam Ross banged out QSOs with W9EHX, W9UCH, W9ZHL, W9SUV, W9ZHB, VE3AIB, VE3EAH, W1IZY, W2FBA, W8FQK, W8GJU, and others. W1IZY called W8RWW, in Detroit, to no avail, and sez that if Al doesn't answer him next time, he'll be getting a bomb through the mail instead of an SWL card! Jack's signals were reported heard by W9NFK and W9WOK. W8BFQ, Marge, had to get the OM (Jerry, W8WJC) to wire a key into the two-meter rig in a hurry. W0HID and W0ESL were also heard active during this opening. . . . W2JAV hooked W8WXV on phone, but had to haywire a key into the B+ lead of the exciter to do any real good. Phil gave W8WXV his first N. J. QSO. W1HDQ was laying a good signal into the midwest section, and it is reported that he worked Indiana and Illinois during this opening.

August 19: This was THE NIGHT! From early evening until almost dawn the northern skies were aflame. And, from the sound of the two-meter band, most of the regulars had planned to spend a quiet night at home. Even Ye Ed caught this one! The best DX contact we have heard about was W4AO, Falls Church, Va. to W0IHD, Chillicothe, Mo., approximately 887 miles. There, but for W5VY and W8WXV, would have been a new record. This aurora produced effects even in the deep South, as W5JTI, Jackson, Miss., proved by working W8WRN, of Columbus, Ohio. This contact took place at 3:57 a.m. EST on the 20th. . . . W9FUJ reports working W2RPO on aurora skip at 0854 CST on the 19th (Wonder if Sam meant the 20th?). . . . W4HHK near Memphis, was in on this one, and heard his first W3 calling him. (He found out afterwards that it was W3RUE. Are you going to count it a QSO, Paul? If you do, I'll have to count that QSL I got from W4MKJ, in Louisville, Ky., even though I didn't get his call through solid during the QSO!) . . . W8BFQ was in there with one of the strongest signals of all. It probably would have supported voice modulation. She was heard extensively in the east, even by the vertically-polarized gang. The success of W8BFQ and other high-powered stations during auroras, seems to prove that having a little extra power in reserve might be a good idea. . . . New Jersey was represented by W2EH, W2NLY and Yrs. Truly. . . . An electrical storm of major proportions kept the activity low in a large portion of the area covered by this opening. W1HDQ, W4AO, W2BV/3 and others complained that they couldn't have heard locals through the static, during the best part of the affair. . . . W1IZY gave many of the gang a crack at a Massachusetts contact. . . . Ye Ed got W9EHX for our first Illinois QSO and W8RWW supplied Michigan. Yep, we finally broke that 13-state jinx! W2EH caught W9UCH for his first Indiana QSO. . . . W2BAV smelled the air, took a barometer reading, and decided to spend the night at the base of the mountain where he has built his super ham station. Bill sure regrets that decision! W2BAV wants it known that he has relented and installed a key—especially for auroras!

As if to demonstrate that it would be practically impossible to include full details on this opening here, W8WRN has sent us a list of stations logged. It includes 6 W2s, 6 W3s, 5 W4s, W5JTI, 15 W8s, 12 W9s, 2 W0s, and VE3AIB. Wonder why he didn't hear the W1s, 6s, and 7s? Better luck next time, Ken! He suggests that it might be well to tilt the antenna to get higher-angle radiation for this type of opening—a good idea. In the North, some auroras appear very high in the sky. . . . W8EP was putting in a very loud signal from Terra Alta, W. Va., but between the aurora effect, a slow-keying crystal, and a genuine, OT DX swing (music to an ol' brass-pounder's ears,) smoke was kinda hard to copy! . . . . W3QKI was doing OK. True to form, Herb's signals were arriving in N. J. strictly hori-

Well, our "States Worked" totals are all screwed up again. How about getting the latest listings in?

August 25–27: Again the northeast was treated to widespread good conditions, and again VE1QY

(*Continued on page 53*)

DX AND OVERSEAS NEWS

Conducted by HERB BECKER, W6QD*

THIS MONTH WAZ HAS BEEN ACHIEVED by the following wellknown DXmen and we offer our sincere congratulations. Certificates have been awarded as follows:

219	W7KWC	Elroy C. Meyer	40 – 139
220	W6BZE	Richard Shanks	40 – 161
221	OE1CD	H. Eddi	40 – 170
222	VK2HZ	William Moore	40 – 171
223	W6EHV	Gordon B. Fisher, Jr.	40 – 180
224	CE3DZ	Alfredo Quintana	40 – 180
225	W6DUB	Mario L. Chirone	40 – 89
226	G2IO	Jack Lees	40 – 152

Are you all set for the World Wide DX contest? This is the third annual contest sponsored by *CQ*, and, as most of you know, the last weekend in October will be devoted to the phone section, while the c.w. section is scheduled for the first weekend in November. If you haven't sent for your contest log forms, you had better do it before it's too late. Reprints of the contest rules are also available, and they can be had by sending a self-addressed envelope to our New York office, as follows: CQ Magazine, 342 Madison Avenue, New York 17, New York.

Through the grapevine word comes to me that seems to indicate participation in this year's contest will be better than in last year's. However, everyone seemed to think the turnout for last year's struggle was terrific, and if we surpass it this year, it will certainly put a load on whoever tabulates the contest scores.

This might be as good a place as any to touch on the final tabulation of the 1949 contest scores as shown in the July and August issues. There were a number of errors made, and to those operators involved we certainly want to apologize. A few scores were not shown at all, while a few others were slightly mixed up and shown in the wrong sections. We are not trying to alibi out of it, but I guess we do have a right to say that when we learned of our mistakes, we decided to try to do better next time. Since this coming contest is only our third attempt, I am sure you fellows will bear with us.

W1BIH ran up a good score of 125,000 and was left out completely. . . . The score of W5LVD was shown as a single operator, and yet his log was sent in as a multiple operator station. . . . W1CJK was a single operator phone station, and yet some of his score was shown under c.w. . . . W6OEG, who was actually in second place out here as a multiple operator all band station, wasn't shown at all, and in the same category you can put W6QD. However, the latter was probably neglected because of being practically unknown to the editor of this publication. Anyway fellows, we're sorry, and will do our best not to let it happen again.

Well, let's see what we can dig out of the mailbag. First off, our old friend W3KDP: It has been a long time since we have heard from Ren and he sends in a whole flock of new countries. Until lately he had been using, as he puts it, a haywire rhombic, but found the good stuff was always in the wrong direction. Now he is using a 3-element wide spaced rotary, and has grabbed off ten new countries in a little over five weeks.

New Certificate Available

According to W6AM, the Chile Radio Club will issue a WACE phone certificate. . . . W8NKU received word from PJ5RE that a lot of the boys are sending their QSL cards down there without being in an envelope, and may get a few of them in trouble. If you wish, you can send your PJ cards via W8NKU, and he says in this way you will be sure to get a card from the PJ in return. . . . W6BIL received a letter from FK8AH, who wrote that his father FK8AD passed away on July 3rd. All of us regret hearing this sad news. His son, Bob, is going to try and keep FK8 on the air.

HE1JJ receives many QSL cards direct. Many of these, in fact most of them, are without return coupons. . . . HE1JJ says the trips to HE1 are usually quite expensive and since he is no millionaire, it is impossible for him to QSL direct. As it stands now, if some of you have not received his card through the bureau, drop him a line giving date and time of QSO and he will send you another card. He expects to go to HE1 again soon, and will have increase power, this time 150 watts on c.w. and 120 on phone.

The following is lifted out of a letter received by W6ARI from PK6LN. . . .

"Don't you worry OM, 99% of mi QSOs on c.w. are still wid Ws, but it is almost impossible to hear all the Ws calling me. Say Jim, what do you think

---

* *Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.*

W. A. Z. HONOR ROLL

CW & PHONE

WAZ

W1FH	234
W6VFR	233
W2BXA	228
W6EBG	226
W6ENV	226
W3BES	225
W6GRL	224
W3GHD	224
W6ADP	224
G6RH	222
W0YXO	224
W6PED	223
W6MEK	223
G6ZO	222
W3LOE	221
W6ITA	219
W8BHW	218
G2PL	216
W2PEO	215
W6FSJ	215
W6SN	215
W2AGW	213
W4AIT	213
W3EVW	213
VK3BZ	213
W0PNQ	213
W6TT	212
W6AM	212
PY1DH	212
W6SYG	212
W6MX	211
W6NNV	211
VE7HC	211
VK2ACX	211
W6SAI	210
VE7HC	210
W9VW	209
ZL2GX	209
W6MJB	209
W2AQW	208
W8HGW	208
W9NDA	208
ZL1HY	208
W6DZZ	208
W6SC	207
W6OEG	207
VE7ZM	206
W4BPD	206
W7GUI	205
LU6DJX	205
W6MVQ	205
W6DI	204
W6PKO	204
VK2DI	204
KH6CT	204
CE3AG	204
W4CYU	203
ZS2X	203
VE4RO	203
W8BRA	203
W6RM	202
W6OMC	202
W6PB	202
W6AOA	202
W7AMX	201
W6PQT	201
W6BPD	201
W9KOK	200
KH6BA	200
VK5JS	199
W6TS	198
W2IOP	197
PY1AJ	196
W6WB	196
G2FSR	196
G4CP	195
W5KC	195
G6QB	195
KH6IJ	194
W6GDJ	194
W6GAL	193
W6DLY	193
W6EFM	193
W6RBQ	193
W6AVM	192
W6HX	192
W0DU	192
W6ZCY	191
VK2DI	191
VK2NS	191
W6RW	190
W6SRU	190
VK3JE	189
W6TI	189
ON4JW	189
W5GEL	189
W0NTA	188
W6AMA	186
W2CZO	185
W6RLN	185
W6SA	184
W6UCX	184
G3ATU	183
W2JVU	183
W6VE	183
LA7Y	182
W6KRI	181
G8IG	181
W0ELA	181
W6EPZ	180
W6IFW	180
OK1FF	180
W6EHV	180
CE3DZ	180
W8SDR	179
I1KN	179
W6UHA	179
KH6QH	179
VK4HR	178
G3DO	178
W7DL	177
W0UOX	177
VK6KW	177
W6UZX	177
CX1FY	176
W6IBD	176
KH6CD	176
W1AB	175
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W6TZD	173
W9VND	173
KH6VP	172
G5YV	172
OK1LM	172
W6WWQ	172
W6SRF	171
W0SQO	171
PY1AHL	171
OK1HI	171
VK2HZ	171
OE1CD	170
W6BAM	170
W6PZ	169
W5AFX	169
W6JZP	168
W6ANN	167
VK3CN	167
G2VD	167
W6DUC	166
KH6MI	166
W6CEM	166
VE7GI	165
W6LRU	165
W6BUD	165
W6LN	165
W6JK	164
W6EAK	163
W6YZU	163
VE7VO	162
W6PH	162
ZS6DW	162
W7ENW	162
VK4EL	162
W6PDB	161
W6BZE	161
W6PUY	160
JA2KG	160
W6MHB	160
I1IR	158
W6CYI	157
W7BD	157
W0OUH	157
W7BE	156
KH6LG	156
W6BAX	155
G3AAM	154
W6KEV	153
G3YF	152
G2IO	152
VK2QL	151
OK1SV	151
W6LEE	150
W6FHE	150
W6EYR	150
W6LDD	150
OK1CX	147
W6LS	147
W6RLQ	147
W7DXZ	146
W6AYZ	146
VE6CD	146
W9NRB	145
W6MUC	145
W6QD	145
W6LER	145
KH6VP	145
ON4TA	144
G3BI	144
W6RLQ	144
KH6PY	144
W7LYL	143
W6ONZ	139
W6ID	138
ZC1CL	138
OK1WX	135
G3AZ	133
W6TEU	133
W6RDR	133
W6OBD	131
ZS2CR	131
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
PK6HA	124
G5VU	124
W6BIL	124
W6NRQ	123
W6MLY	123
ZS6CT	113
KG6AL	103
VK6SA	103
W7KWA	98
W6DUB	89

39 Zones

W8NBK	219
W3KT	219
W3DPA	218
W9ANT	218
W2NSZ	212
W0NUC	211
W9RBI	211
W3IYE	209
W1ENE	209
W1BIH	209
W2HHF	208
W3JTC	208
W1JYH	208
F8BS	206
W3OCU	206
W3EPV	203
W9IU	201
W2HZY	209
W5ASG	200
VE3QD	200
W4GG	197
W2GWE	195
W2WZ	193
W2CWE	192
W3DKT	192
W3JNN	191
W1HX	191
W2AGO	191
W1AWX	191
W2EMW	187
W8SYC	187
W3JKO	186
W9LNM	186
W0EYR	186
W9MXX	185
W1ZL	185
KP4KD	185
W8RDZ	184
W3DRD	183
W4INL	183
W3KDP	181
W1DQH	181
VO6EP	179
VE3IJ	177
W2CNT	173
W8CVU	172
W4LVV	171
W9LM	170
W6CTL	169
W1NMP	169
W3JTK	169
OZ7EU	169
PY2AC	168
W4DKA	168
F9BO	167
W2CYS	167
OK1VW	167
W2BJ	166
W4VE	166
W8LEC	166
W7PGS	164
W9FKC	163
W4BRB	162
VE3AAZ	161
W2RGV	161
W4RBQ	160
W4AZK	159
W0GKS	158
W4OM	158
W0AIW	157
I1AY	157
W9YNB	155
DL1FK	155
W8VLK	155
I1AIV	154
W9TQL	154
W2RDK	152
W8WWU	152
HC2OT	151
SM5WI	148
W9ABA	147
W2COK	146
W2GUR	146
GM3CSM	146
W2MEL	145
OK1AW	144
TF3EA	142
W6ATO	142
W6LGD	141
G3AKU	141
W9DUY	140
W6KYV	139
I1XK	137
W6KYT	135
W6NTR	132
W7ETK	132
VK4RC	131
W6TE	131
CR9AG	131
W6WJX	131
W5CPI	130
OE3CC	128
VE7KC	127
DL1DA	127
W9NZZ	126
W7BTH	126
VR5PL	124
W6MI	124
W6MUF	123
KG6GD	121
DL3DU	118
W6NRZ	117
KL7UM	117
ZS2EC	116
W7HXG	115
W6JWL	114
W6EYC	114
KL7GG	114
W6VAT	110
W6FBC	110
W7GXA	105
W6LEV	103
W7LEE	91

38 Zones

W2HMJ	190
W2PUD	180
CM2SW	174
W8KPL	173
W8FJN	167
W8EYE	158
W2SHZ	158
W2RGV	156
W2UEI	156
LU7CD	155
W2GVZ	154
4X4RE	146
W3LVJ	145
W8ZMC	143
ZS2AT	143
W0AZT	143
VE2BV	140
W9FKH	135
VE3ACS	134
W4FPK	131
W2PQJ	130
W3ZN	129
W0RBA	127
W9MZP	126
FE8AB	126
W5FFW	126
W9TB	122
GW4CX	120
W6ETJ	119
W0FET	118
W6CAE	113
KL7PJ	108
W7EYS	107
W6FXL	92
C1CH	84

37 Zones

W1KFV	168
W2ZA	160
W3WU	152
W4IWO	149
W3FYS	147
ZL3CC	143
GM2UU	142
W4ML	140
W2WC	136
W2AYJ	133
ZL3AB	131
W7HKT	130
W4DIA	129
W9HUZ	126
W1APA	125
W9LNH	122
VE1EA	116
W0FWW	108
OH3OE	93

36 Zones

W4HA	151
W9WCE	136
OA4AK	128
VE1PQ	128
W3AYS	124
F8TM	124
W9LI	124
SV1RX	119
W2BF	115
VE5JV	113
4X4BX	112
OE1FF	111
W5CD	108
W2JA	102
W5BX	99
VE8AS	93

35 Zones

W2OST	146
W1BFT	141
W4DHZ	132
W9CKP	132
W6ZZ	120
W9RQM	119
CO6AJ	119
W8AVB	119
G6QX	117
W9FNR	112
W9DGA	112
W2HAZ	109
KZ5IP	108
W0GBJ	101
ZL1QW	99
DL3AB	79
KL7CZ	69

34 Zones

W1DEP	150
W8NSS	133
W4IYT	127
W3MZE	121
W1MRP	118
W5NTT	107
W8JM	102
G2BVN	91
W9WEN	83
W8PCS	80

33 Zones

W4QN	110
W5FXN	101
W2SEI	100
W8QUS	85

PHONE ONLY

39 Zones

W6DI	192
W6VFR	172
HB9DS	164
W7HTB	161
VQ4ERR	160
VE7ZM	145
DL1FK	125

38 Zones

W2BXA	179
W4CYU	173
ZL1HY	162
W9NDA	159
G8IG	155
W1HKK	153
W6KQY	149
F9BO	143
W6AM	121

37 Zones

XE1AC	189
W1JCX	179
W9RBI	173
W3LTU	169
W8REU	163
W7MBX	158
VK3BZ	158
G3DO	155
G2PL	154
W6WNH	153
W6PXH	153
W8BF	146
W6TT	139
W3JNN	136
F8VC	124
W7MBW	124
C1CH	83

36 Zones

W1NWO	173
W1MCW	171
W1BEQ	164
PK4DA	150
W9HB	150
W4ESP	148
W2DYR	140
W9BZB	139
GM2UU	135
W6PDB	130
W4INL	129
W1FJN	128
W8AUP	128
G6BW	127
W9HP	127
VE7HC	123
VE3BNQ	122
W0HX	120
W3GHD	114
W3DHM	96
W6SA	92
F8DC	87

35 Zones

HC2JR	152
W4HA	142
W6PCK	141
W9RNX	135
W6CHV	133
W0EYR	131
HC2OT	130
W2RGV	128
W2GHV	126
W0PRZ	124
W9CKP	124
G8QX	123
W8ZMC	122
CE3AB	121
W0PUE	117
W5LWV	108
W4OM	106
W3PA	105

34 Zones

LU8CW	129
W9BVX	126
W5KC	125
W2ZVS	124
W4LZM	124
W6UZX	123
W8BIQ	122
W0ANF	115
W1BPH	105
W8UIG	100
W4IWO	100
W8QBF	92

33 Zones

W5ASG	134
W9MIR	127
W5ALA	122
W9WCE	119
W3KT	118
W2ZW	115
W8BFQ	114
W8SDR	113
W8NSS	112
VE3BQP	108
W0ANE	106
W2PQJ	100

The operating position at OK2SO, with the Chief Op himself holding down the foreground. Some idea of the shortage of commercially-built gear in OK-land can be had from close inspection of the rig. Apparently TVI is not a problem in Czechoslovakia, yet!

abt giving the 'little fellows' also a chance in working me? I am sure they are completely over-covered by the 'Big Shots'. Pse drop me a letter in ur spare time, wid a list of stations working wid inputs of 20 watts or so. Will be looking for them every Saturday around 1100 GMT, on 20 mtrs." . . . Well, what do you think?

I see in the *Southern California DX Club Bulletin* that W6RLN heard ZB2I very weak. He started to give him a call but evidently shoved the link too far and blew a fuse. He never heard ZB2I again.

FLASH. . . . For some time we have had the sneaking suspicion that PX1A was a hoax, and it has now been proved. As a consequence, PX1A has been closed down. Due to some high-powered snooping on the part of several people, this was brought about, but we can't give you all the gory details this month, so tune in next month and see what happened to PX1A. In the meantime, scratch one!

XE1AC has word that official licensing has not as yet been done in Spanish Guinea. However, he says apparently there are a couple of stations about ready to break loose. . . . The same thing applies to Ifni, but at this time we're not too sure whether they are on or off the air. . . . On the other hand, CE3AG during wireless communication with W6ENV told of working EA0AB on 14,150 phone. Draw your own conclusions, Gents. . . . ENV had quite a night, as he also hooked DL1FF to pass along word that LP2J is on Jan Mayen Island, and it is probably a weather station. 14-mc c.w. is where you might find him.

Heard a couple of possibilities the other day. . . . FG8A and FS8AD. One rumor has it that the latter is G2AD and a QSL via REF. Another source tells us a different story, so we just ain't a'countin' either until we know.

In addition to FP8AC, G6RH hooked VQ8AS on Chagos, 14080. . . . 4X4RE is up to 38 and 146 and lacks Zones 6 and 23 for WAZ. . . . LA7Y is up to 182 countries and lest you forget, he made WAZ some time ago.

In the August issue something was said about amateur activity on Midway folding up. W9LTT reminds me that Midway is not an island, but actually two islands. We know that, but I suppose since practically everybody refers to it as "on Midway," or "Midway Island," we just did the same doggone thing. . . . Regardless, he was stationed out there at the end of the war and so was the first postwar ham station to get on the air. Joe got his ticket in August, 1946, and as we said before, is now signing W9LTT.

The Belgian National Broadcasting Service tells us that there is a station on in Leopoldville, Belgian Congo, with the call letters OTC. It is called the International Goodwill Station and operates on 9767 kc. Its power is 50 KW, which I'm sorry to say is somewhat beyond the amateur limits. . . . Anyway, OTC makes regular twenty minute broadcasts for amateurs in collaboration with amateur clubs. Each program consists of news about amateur transmitting and receiving problems, interviews with Belgian and foreign Hams, DX news, a letter box, and the review of amateur radio periodicals. . . . All of you interested in giving OTC a listen will find them on every Wednesday at the following hours: 1810 GCT in Dutch; 1910 GCT in English; 2010 GCT in French. Comments and suggestions are welcome, and use the following address: Belgain Overseas Service, OTC, Programme DX, 18, Place E. Flagey, Brussels (Belgium).

Word from Niue

ZK2AA points out that many hams in sending their QSL cards either to him or to ZK2AB, address them with "via N.Z.A.R.T." when it should be "via New Zealand." W6NTR received his card some time ago from AC4NC and is now waiting for a card from either VK1RA or VK1VU. He needs one of them for WAZ. . . . Of course, everybody is reporting FP8AC this month, in their lists of country additions.

W8SYC is off the air again due to moving to a new location. He thinks this new spot will be better than the old one, and along with it is a new rig, winding up with a pair of 4-125As. . . . W9HUZ has a wide-spaced 3-element rotary beam without a motor hooked to it. They simply run outside, grab the rope, and run. Don't know how they stop it, but maybe they just work something wherever the beam stops. . . . It's good to hear from VE3QD. He brings his country totals up to date, but as yet Roy has not heard anyone in Zone 23.

KP4KD tells me that his luck either improved or KR6CA got a new receiver. Whichever it was, it paid off and he grabbed him. . . . Another new one for Ev is KC6WC.

Which OY3IGO did you work? ? You say you received a QSL card? ? ? In this case, it might not mean a thing, because there were two stations signing this call. One, of course, is the good OY3IGO, and the other is very much NG. The odd part is that both QSL cards look very much alike, but the signatures are very, very different. We have been seeing the signature of Ingvar for years and it looks nothing like the guy signing the card for the illegal OY3IGO. . . . Now you ask, do we know who this pirate is. Yes, and a little tip, you might ask a certain SM5 about it. What a business!

W4IWO believes in working his DX the hard way by having his antenna in the living room of his apartment, all this due to a very unsympathetic landlord. Mike says things are looking better, as he has purchased a home in Rockville, Maryland, and has high hopes that his list will be on the up-grade from now on in.

A swell first day cover from Niue Island contained a letter from ZK2AA, which I am quoting below:

Owing to pressure of work here during the last month or two, I regret that I have slipped behind again with QSLLs and it may take some little time for me to overcome the backlog, but this will be attended to, as soon as the opportunity offers.

I would also like to take this opportunity to thank many W-land friends who have so kindly helped me out in various ways during the past year or two and to pass on the following information.

Owing to a change of plans, I now expect to leave Niue for New Zealand next February. I have just finished a 3-element beam for 10 and am constructing a 4-el for 6 also. As soon as I receive a crystal for 6, I will probably be on both these bands consistently until I finally QRT as a ZK2. So, Oms, please look for me on about 28,442 kcs phone on Saturdays and Sundays henceforth and I will let you know the 6 metre frequency later.

To the many Ws I HAVEN'T worked, you will no doubt be pleased to learn that Niue now has another licensed Amateur, viz, ZK2AB, who should be on 10 and 20 about the time I leave. There is a possibility that another ex ZL shall be obtaining a ZK2 call shortly.

If all goes well and we can overcome the many obstacles that confront us, George, ZL1DA and myself hope to be present at the Seattle Conference next year and hope to be able to chew the fat with many of you personally at that time.

W1APA did a lot of snooping around the bands during his two weeks vacation, and couldn't find one new one. Next time he had better arrange his vacation whenever conditions show up good. That's a fine vacation, Gil.

W4TO worked YA2B for his first USA contact, while W4JDR fell in for the second QSO. Buck said YA2B was running 250 watts and was T9X on 14,021. Buck got this info from 4X4CJ. Although YA2B said to QSL via W2SN or a P.O. Box in Kabul, it now develops that 2SN knows nothing about it, and further word from a ZL indicates we should keep our eyegrows lifted for a while longer. By the way, this young fellow W4JDR will bear watching, as he's certainly coming up fast in DX. . . . Before dropping W4TO completely, he says that 4W8AB is supposed to be in Yemen, and another "supposed" station is FB7C.

According to W2DFK, a few stations have been licensed in Saarland. Now before you start drooling, let me remind you that this is not a separate country . . . that is according to The Country List. Anyway, the following are the calls of the apparently newly licensed stations: 9S4AX, 9S4AL, 9S4AZ, and 9S4AR. QTHs will be found in the usual place.

G2MI told W2HMJ that he thinks MD9AA is in Yemen, but will hold off reporting him pending further investigation. . . . W3FYS hasn't been able to work any new zones, but he did rack up 11 new countries. Now he's working on a VQ8 with the hopes of moving up a notch. . . . W3DKT adds 5 which makes him 192. Another W3. . . . This one OCU, is still waiting for a card from AC4RF. Never give up, Hal, I'll bet you get it. . . . W3KT worked VR1C and UM8KAA, although has not as yet received a card from the latter. He has, however, seen one of the cards come through the W3 bureau, so it actually is being done.

QTH COLUMN

ZK2AB	Chas. P. Slaven, Alofi, NIUE via New Zealand
LP2J	Via N.R.R.L.
EAOAB	Angel Margallo, Box 111, Santa Isabel, Fernando Poo, Spanish Guinea
9S4AX	Alfred Woerner, Saarstrasse 9, Saarbrucken 3, Saarland
9S4AL	Rudi Bluel, Heinstrasse 24, Saarbrucken 3, Saarland
9S4AZ	Fritz Meyer-Buchardt, Halbergstrasse 35 Saarbrucken 3, Saarland
9S4AR	Kurt Schneider, Scheffelstrasse 39, Saarbrucken 3, Saarland

Here is the Okinawa Radio Amateur League, in full force. Identification of the characters is as follows: Front row, in the relaxed position, KR6AD, CI, DR, ED, BU, DL, DQ, CE, CL, DU, and EE. The tall boys in the vertical position are KR6CO, EC, EH, DZ, CH, EI, BA, and CF. Oh, yes, they get on the air from time to time.

The YL's Frequency

Conducted by LOUISA B. SANDO, W7OOH*

We have sad news to report this month. A letter from Carol, W6WSV, tells of the passing of Helen Cook, W6MWO, on July 30th, of cancer. "She was very young," adds Carol, "so it was quite a shock to all of us. Helen was active in ham radio until just a couple of months before her death. In spite of great pain she attended several hamfests and our YLRL meetings. She was always a bright spark in our group, with her energetic vitality and good sense of humor. YLRL never had a harder working nor more conscientious secretary or president than Helen Cook. She held the office of secretary in 1946 and served as YLRL president in 1947. She used to spend entire weekends and any spare moments at work even getting things typed or mailed for YLRL during her periods of office. She would consult those who formerly held office for opinions on major and minor decisions affecting YLRL, for which she would be responsible. Much of Helen's own salary went for long distance phone calls to sister officers in far flung parts of the U.S. on YLRL matters. Helen was employed by Warner Brothers Studios in the make-up department, and among her dearest and closest friends were Barbara Stanwyck and Ann Sheridan. We in the Los Angeles YL Club will miss Helen greatly—her quick wit, her faultlessly groomed appearance, her readiness to volunteer when needed, and her friendly spirit toward all she met. A real loss to our club and to YLRL is Helen's passing."

What would you YLs think of setting up a Helen Cook Memorial Award for one of the YLRL contests? Any suggestions?

Anabel, W3NNS, and sister Jeanette, W3QPO.

Back Tracking

Due to the length of the report on *CQ's* DX Contest in the August issue, much of our column had to be cut, and in that issue we found ourselves unceremoniously hopping from the QTH of W5IZL in Electra, Texas, to New York City—hi! Since we visited other YLs, we'll now pick up the thread again.

After a most pleasant visit with W5IZL and W5AWQ, admiring Ruth's mobile set-up and trying out the station where she is on 10 phone and 20 and 40 c.w., we moved along to Dallas where we stayed with Bernice May, W5JKM, and her OM, W5AJG. As you may remember from an earlier writeup, Bernice and Leroy are v.h.f. enthusiasts. And what a setup they have—a "shack" that could double for a b.c. station, and on a 70-foot tower in the backyard are stacked 10-, 6- and 2-meter beams. For 10 it's a 3-element wide-spaced rotatable. Over this is a 4-element wide-spaced 6-meter beam, 75 feet above ground. An exact copy of another 4-element beam mounted on a rotatable 35-foot pole close to the house, both beams are fed with RG-8/U coax, and a switching relay is used to select either for transmitting or receiving. Over the 6-meter beam is a 10-element horizontal 2-meter beam put up for this summer's 2-meter work. It consists of two stacked 5-element beams spaced one-half wave apart, and Leroy reports results have been very good. Strapped on the side of the tower, but not rotatable, is a standard type 16-element beam for 2, consisting of 8 driven elements backed by 8 reflectors. On 2 they now run about 60–90 watts input to an 829B, with the next project an increase to several hundred watts. W5AJG and W5JKM spend all of their time on v.h.f., though Bernice finds her time strictly limited between caring for Susie (4) and Mike (12), attending PTA meetings, having a den of cub scouts, gardening (we left wearing a lovely corsage of gardenias), and assisting the OM with the W5 QSL Bureau. After corresponding for years, it was surely pleasant to visit with the Mays.

After leaving Bernice we stopped to see Rose Reiffin, W5TU, in Dallas. We had formerly known Rose as W2TU in N.Y.C. so there was much to rag-chew about. Since living in Texas, Rose has developed a new appreciation for ham radio, for all winter long she had almost daily skeds on 10 with her family in New York, often via Lil, W2PMA, and she is now trying to continue the skeds on 20.

After a perfect score to that point, our next few tries didn't produce quite such good results. A call to W5IZK, Vivian Hug, in Dallas brought no an-

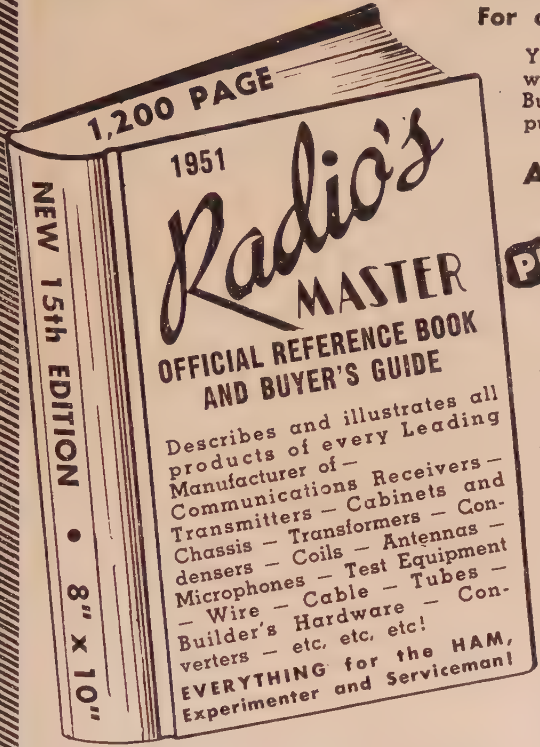
(Continued on page 57)

---

* *(She's on the road and we can't locate her, either. Try c/o CQ Magazine.)*

WOULD YOU SEND $1.50 TO GET $9.50 ?

WELL, HERE'S EVEN MORE FOR YOUR MONEY!!


1,200 PAGE
1951
Radio's
MASTER
OFFICIAL REFERENCE BOOK
AND BUYER'S GUIDE
Describes and illustrates all products of every Leading Manufacturer of — Communications Receivers — Transmitters — Cabinets and Chassis — Transformers — Condensers — Coils — Antennas — Microphones — Test Equipment — Wire — Cable — Tubes — Builder's Hardware — Converters — etc. etc. etc!
EVERYTHING for the HAM, Experimenter and Serviceman!
NEW 15th EDITION • 8" x 10"

For only $1.50, you get —

	Your own personal copy of the world famous Radio's Master Buyers Guide, priced by the publishers at —	$5.50
AND	Four Credit Slips, each worth $1.00 on orders of $5 or more.	4.00
PLUS	All you can save with this book and Harrison's low prices!	$$.$$
	Total Value — Over	**$9.50**

YOU'VE undoubtedly seen previous editions of this indispensable book at the right hand of important Engineers and busy Purchasing Agents. Now, here is your opportunity to put it to work for you — to save you real money and time in your purchases of Radio-Electronic equipment and parts.

AND, who brings you this sensational offer?

Only HARRISON!

Your HAM HEADQUARTERS since 1925! As Authorized Factory Distributor for all leading manufacturers, we give you fast and dependable mail order service — immediate deliveries from our huge stock! And our prices are guaranteed to be the lowest obtainable anywhere!

Plenty of active hams on our staff to make sure that all of your orders and inquiries are handled intelligently!

● ●

HURRY! Don't Miss Out!

QUANTITY LIMITED!

- Not a condensed, incomplete, mail order type catalog but a comprehensive encyclopedia of all radio parts and equipment. Produced with the full cooperation of hundreds of top manufacturers such as National, Amphenol, Bud, Webster, RCA, Hallicrafters, Johnson, Astatic, Thordarson, Eimac, B & W, Millen, etc. etc. The very latest, complete information!!
- The detailed specifications of all makes, and list price discount code, means you can pick the best items for your purpose and order them from HARRISON at lowest cost.
- An attractive, durably bound, hard cover book, with handy index, which takes the place of the usual pile, or incomplete file, of manufacturers' catalogs.
- Whether you build, buy, or are just planning, it will pay you to get this book now!

Have a problem? Need information? Just drop me a line. You'll get a prompt, personal reply by return mail. *73, Bil Harrison, W2AVA*

HARRISON
NEW YORK 7, N.Y.
225 GREENWICH STREET
(10 West Broadway, at Barclay St.)
BArclay 7-7777

Rush Letter or Coupon Now!

Bil Harrison, W2AVA
HARRISON RADIO CORPORATION
225 Greenwich St., New York 7, New York

OK, Bil — Here's my $1.50. Mail me, postpaid, the new Radio's Master, discount code, and those four $1 credit slips, with 10 day return for refund privilege. Also send me future Ham-A-Logs, without charge.

Name ______________________ Call ________
(If licensed amateur)

Address ______________________

YOUR MONEY BACK if you don't agree that this is the biggest bargain you've ever seen!

The Monitoring Post

gleaned by THE BRASSPOUNDER

Civil Defense organizations are being talked about all over the country, yet for the ham, nothing is happening! Several municipalities have invited the hams to participate, but it seems that is as far as it goes. Let us consider the situation.

Unlike 1942, when amateur radio had to stand by, with ham licenses suspended as of December 7, 1941, and while the Board of War Communications mulled over the question of to what purpose the ham could serve, we now have an opportunity to prepare and train operators in emergency communications. However, such an opportunity is not entirely to the liking of most of us, for training means building gear for frequencies on which we can no more than assume will be allocated for civil defense. At the moment our thoughts are that as long as the War Emergency Radio Service was activated in 1942 for purely local communications, it is likely that another such organization would be established again, in the event of hostilities, on the present 144-mc band if licenses are again suspended.

It seems a sheer waste of time, energy, and money to endeavor to set up any such network of stations, even on 144 mc, when we cannot even be reasonably sure that this band would be allocated for Civil Defense work. There is the possibility of Civil Defense operation being done on 224 mc, or even 420, but nothing definite to date. Therefore, we hesitate to begin something that may perhaps be washed out the moment any hostile action is recorded, wasting weeks, months, or years in such development.

Amateur radio is willing and anxious to justify its existence, aside from supplying trained personnel for the armed services, as the majority of the 85,000 operators will not be eligible to participate in military or naval service because of age limitations, disability, etc. Yet, in this majority we have a wealth of conscientious, capable radio operators and technicians whose talents should not be either overlooked nor wasted.

We have been told that radio communications in civil deefnse will not be considered for at least a year, or possibly two years, though at the same time a plan of operation and participation of the amateur was asked for, and supplied.

With present-available amateur equipment and operators a comprehensive, nation-wide network of stations can be organized to function during floods, earthquakes, hurricanes, explosions, and consequences of armed attack, or, in Civil Defense, to be used in alerting the entire nation of a pending armed attack. In addition, local networks of amateur stations can now be developed to serve their communities. To do this, frequencies must be made available for this specific service. Frequencies other than the present amateur bands that would remain in effect in the event of war; so that training could begin immediately with a definite purpose in view; so that transmitters and receivers could be built with the knowledge that this gear is not being constructed futilely.

For the most part WERS equipment was supplied by the ham during a time when component parts were almost impossible to purchase and when there were virtually no batteries obtainable to energize emergency stations. Emergency power for gear to be used in Civil Defense is of paramount importance, for with the advancement of bombing techniques and aviation we can hardly feel any sense of security in our commercial power lines and power stations being unaffected by enemy action. Nor can we feel that any community will be immune from enemy action.

Hasty evacuation of large communities is a major problem in Civil Defense planning. Whether this exacuation of population is conducted before or after a bombing, there is no question of the need for many mobile stations and walkie-talkies, for such moving of population will demand a great deal of communications, if for no other reason than to prevent the blocking of transportation routes and facilities, where one station would be needed at least every half mile along routes taken by evacuees. It there any radio service in existence today capable of supplying such vital communications? There is a chance now to set up such a system using ham facilities.

Training of airplane spotters is being developed. Calls are being made for volunteers in the Air Warden Service and auxiliary fire fighters are in training. Volunteers for many other services in Civil Defense are being sought. The amateur radio operator, who always volunteers his services and the use of his costly equipment, though often spurned because of the ignorance of his capabilities, is already trained as an operator, but is not being activated in Civil Defense. That is probably because it is known that when the time comes to seek the voluntary services of the amateur, he will be ready almost overnight to do a pretty good job, as he has proven innumerable times during the past few decades.

It should not be overlooked, however, that if given some time to organize, to prepare and build equipment for the specific needs of emergency communications in civil defense, the ham will do a job that will exceed any undertaking in the history of radio communications. Hams are ready to supply fixed, mobile, maritime mobile, walkie-talkies, and handy-talkies, in addition to training personnel in unlimited numbers, to cope with any communications emergency, if only given a little time to do so.

Some News

W5FEC became prexy of the Lawton-Fort Sill ARA recently, with **W5PML** as v-p; **W5RDK's** xyl as Secretary; **W5KS**, treasurer, and **W5NGF** editor of the official organ of the club. . . . **W5QPR/1** in Maine on a two-months vacation has returned to El Paso. . . . **W4ORK** has worked all states with 3 watts input on 7 mc. . . . **K5WAH** has closed down indefinitely; **W5FOM** has been appointed by the 4th Army Area HQ to take over the MARS duties. . . . **W5PML** who has been responsible for the activity at **K5WAH**, tells the boys to be on the lookout for a new **HL1** station on 7 mc. . . . **W5OQU** has resumed business at Cement, Okla. . . . **W8OWA** has to make room for another —a junior op came to stay recently. Congratulations.

W9SAL, All States RC at Valpariso Tech. Institute in Indiana, has on its roster of opera-

(Continued on page 58)

V.H.F.—U.H.F.

(*from page 39*)

was on deck at the northern end of the opening. In the early evening of the 25th, Jerry worked at least 5 W4s, among them W4CLY, W4OLK, and W4JFU. The latter was heard complaining that there were no stations active further down the coast. He claimed VE1QY's signals were so strong at Parksley, Va., that they must have been going a good deal further south. What has happened to the North Carolina gang (not to mention the boys in Florida!) Speaking of North Carolina, W3IZE and W3PZK travelled to this state over the week-end of the 12th. They found conditions hardly up to normal, but managed to work a total of 13 stations anyway. The best DX was W3ASD, the ol' fat boy at Smyrna, Delaware. Ye Ed had a special interest in getting N. C., and wasted lots of kwh calling, to no avail. W3IZE, the sonofagun, gave us an "A" for effort, and sent us an SWL card edged in black!

That about tells the two-meter story for now, except to answer the question "When do we get another aurora session?" A lot can be said in answer to that question. . . .

The Northern Lights

In view of the excitement which has been stirred up by the record-breaking aurora activity, it might be well to review the available information on the subject. While this long-haired propagation stuff may leave some hams cold, it must be admitted that a little knowledge about the sort of phenomena we are working with may help us to predict the arrival of good conditions, make best use of these conditions when they arrive, and report our observations in a way that they may be of some use to the scientists who are investigating the peculiarities of radio wave propagation on all fronts.

The aurora is probably the oldest recorded ionospheric phenomena. It is, also, one of the least understood. Much of what follows is pure guess work! References to brilliant displays in the polar skies can be found in legend and lore dating back to pre-Biblical times. Fairly good records of occurences of aurora have been kept since about 1800. Sunspots have been observed systematically for about 200 years. There seems to be a very close relationship between sunspot activity and auroral displays. It has been demonstrated[1] that over the past 30-year period the peak of aurora activity occurs in the second year *after* the peak of the 11-year sunspot cycle. In this year of 1950 we are close to the peak of the aurora cycle.

It has been fairly well demonstrated that the aurora is caused by streams of high-velocity charged particles which are thrown out by the sun during periods of intense sunspot activity. These particles are captured by the earth's magnetic field, and under the influence of this field, they "spiral in" around the polar regions. As the charged particles strike the rarified gasses in the upper regions of the atmosphere, they cause it to glow—by a process analogous to that employed in the familiar neon glow tube. This process involves ionization of the gasses, so, during an aurora display, there is plenty of ionized air in the display—like a localized ionospheric layer. It can reflect radio waves, as the v.h.f. hams have so well proven lately. This fact was not

---

[1] *Sunspots in Action*, H. T. Stetson, Ronald Press, N. Y., 1947 P. 85.

RADIO HAMS!

New RADIO'S MASTER is ready for you!

NEW 1951 EDITION
●
OVER 1200 PAGES
●
DOZENS OF CATALOGS IN ONE VOLUME
●
BOUND WITH PERMANENT COVER
●
PUBLISHER'S PRICE $5.50

Radio's only Complete

REFERENCE BOOK AND BUYING GUIDE, giving complete information about all Radio Gear, thousands of illustrations, specifications, and prices. **YOU NEED THIS BOOK IN YOUR SHACK.** Use this special price deal to get it **FREE From FEDERATED.** Special purchase price credited to first order!

FEDERATED PURCHASER INCORPORATED
66 DEY ST., NEW YORK 7, N. Y.

Send a copy of RADIO'S MASTER postpaid. Check for $1.65 enclosed which will be credited to my initial order for Electronic Merchandise.

NAME ______________________
CALL NUMBER ______________________
ADDRESS ______________________
____

CABLE: FEDERPURCH
Federated Purchaser
INCORPORATED
66 DEY ST., NEW YORK 7, N. Y.
Digby 9-3050

NEWARK, N. J.: 114 Hudson St.
ALLENTOWN, PA.: 1115 Hamilton St.
EASTON, PA.: 701 Northampton St.

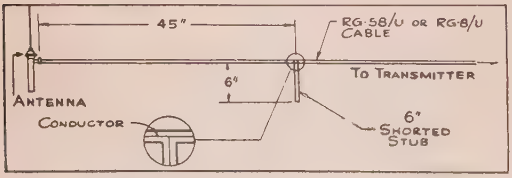
New 10 Meter
MOBILE TRANSMITTING ANTENNA
NEEDS BUT 1 HOLE FOR INSTALLATION

WARD
SPP-143 AUTOMOBILE TRANSMITTING ANTENNA

Ward's exclusive 8-Ball Universal Mount requires only one 15/16" hole and fits any surface curving from 35° below horizontal to horizontal.

Ward SPP-143 transmitting aerial can be installed on the cowl, fender or flat rear deck. Whenever the transmitter is removed, the same hole can be easily plugged or used to mount a Ward 8-Ball standard broadcast antenna. The short 55½" rod reduces damage from overhead obstructions. Construction of the rod assembly permits simple removal in case of non-repairable damage. The special hook-up, illustrated below, developed by Ward research, enables the SPP-143 antenna to match and in some factors exceed the rear mounted ¼ wave 10 meter antenna.

Ward's SPP-143 antenna is sold at leading parts jobbers.



THE WARD PRODUCTS CORP.
Division of The Gabriel Co.
1523 EAST 45th STREET • CLEVELAND 3, OHIO

too well known before the hams, with their directive antennas, sensitive receivers, straight c.w. techniques; using frequencies thought useless for the distances involved and hence virtually neglected except for local-range work, came along and used the aurora to support two-way radio communications. We should crow a little more about this achievement!

The strongly ionized gas in the upper atmosphere during an aurora gives rise to another mysterious effect. As the earth rotates, and the ions drift around it, the magnetic lines of the earth's field intercept many more than the usual number of charged particles. The resultant interaction produces definite changes in the magnetic field. As the earth's magnetic field, which envelops the entire surface of the globe, pulsates, it can induce alternating currents in any closed loop of wire. As a result, low-signal-level circuits, such as telegraph and long-line telephone circuits can be QRMed right out of business! The peculiar randomness of the auroral effects causes the induced currents to vary at an audio-frequency rate, so the interference on long-lines circuits takes the form of noise. The same randomness has a peculiar effect on radio signals which are reflected off the aurora. As the aurora pulsates at its rapid rate, the path-length of the round trip to and from the reflecting region is continuously changing. The strength of the reflected signals also varies. The rapidly shifting path length gives rise to "Doppeler Effect" frequency shifts. The rate of fluctuation is random, rapid enough to appear as noise. The amplitude changes combined with the frequency (or phase) variations, give a reflected signal that is noise modulated, both in amplitude and frequency! Small wonder that reports of "T3" are common during auroras, even though the rig may be crystal controlled. This also explains why amplitude modulation on a continuous carrier—either voice or keyed tone—is usually effectively washed out by the superimposed aurora effect. About the only way of transmitting intelligence is to interrupt the carrier so that the reflected signal is received as a keyed hiss or roar! The use of a BFO at the receiving end will help somewhat, as it beats the main components of the messed-up carrier up to a more easily audible range.

What Frequencies Can be Used for Aurora Contacts?

This question has not yet been satisfactorily answered. We know from experience that signals are affected down to the lower amateur frequencies. The effects are often less noticeable on the lower bands, because normal reflected waves or ground waves are received stronger than the weak auroral reflections. But the "modulation" effects are often noted, as many a ham who has tested out his new VFO during an aurora has found to his dismay!

On ten and six meters, the aurora often occurs at times when other forms of propagation are not present. It was on these bands that its capabilities were first explored. Recently, two-meter activity has reached a level high enough to offer great possibilities for investigation of the high-frequency limitations of the effect. There is good reason to assume that auroral effects sometimes occur on the six-meter band and not on two meters, although certain fortunately situated two-meter observers, for instance, W3RUE, W8WXV, and W8RWW report that two opens as often as six. Radar soundings have been made which show that the aurora has a definite "MUF" just as the other ionospheric modes of transmission. It seems to be a debatable point at this date. Let's hope that the 20-mc and 420-mc experimenters will soon be in a position to throw more light on this phase of the problem.

The Best Location for Aurora

It seems that the best section of the country for observing aurora effects lies north of a line running from New York through Pittsburgh, Des Moines, Boise, and Salem, Oregon. The stations most to the north of this line will have the best opportunities to observe displays, but whether they can make as good use of the aurora for radio communications as those stations near the line remains to be seen. Although London, England, is located closer to the North Pole than is Montreal, the VEs will have a better change than the Gs on aurora, for they are closer to the magnetic axis of the earth, which lies near northwestern Greenland, about half way between the geographic pole and the magnetic pole.[2] Although aurora is rarely visible south of the central U. S. latitudes, occasionally it is visible as far south as the Gulf states. Already this year aurora contacts have been made by W4HHK, near Memphis, and W5JTI, in Jackson, Mississippi. It is quite likely that a lucky combination of good tropospheric conditions and aurora may extend the area affected by the aurora several hundred miles beyond the range which might be predicted by assuming straight-line propagation of the radio waves.

Prediction of Aurora

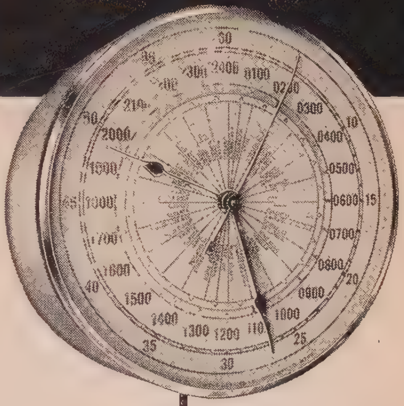
We have stated that the best years for auroral activity are those about two years following the peak of the sunspot cycle. The best months of the year are those during which the sun lies near the plane of the earth's equator. At these times the earth seems to be more nearly in line with the regions on the sun where the aurora-producing spots are located. Or it may be tied in with the angle of arrival between the charged particles from the sun and the lines of the earth's magnetic fields. The months of March and September should be closest to the peak. Most aurora openings occur in the early evenings, around 1900 local standard time. Some are of short duration, others, like the opening of August 19, 1950, may last until nearly dawn. There have been a few cases of daylight aurora openings reported. Since aurora displays are closely related to sunspot activity, and since some spots, or groups of spots, endure for more than one rotation of the sun about its axis, there is good cause to think that aurora openings might repeat on a 27-day cycle. However, the spots seem to shoot the works on one big opening, and the repeats are generally weaker than the first one. Put these predictions are pretty general!

The same solar activity which produces the charged particles which cause the aurora also produces great quantities of ultraviolet radiation. This type of radiation is probably one of the principle causes of ionization in the normal ionosphere. When an unusually severe burst of this energy strikes the upper atmosphere, it may produce abnormal changes in ionospheric conditions. Often, quick deep fades are noticed on normally stable radio signals. These fadouts have been named "Sudden Ionospheric Disturbances." Since ultraviolet radiation travels with the speed of light, it arrives at the earth considerable ahead of the relatively slow-moving charged

---

[2] *Unlocking Secrets of the Northern Lights*, C. W. Gartlien & W. Crouder, *National Geographic Magazine*, Nov. 1947.

DX LOGGING SIMPLIFIED
with this
2400-HOUR CLOCK



MODEL TD-2400

The clock that has been proven and accepted by hams all over the world.

MOTOR: Synchronous clock motor (self-starting), AC operated.*

CASE: 10" diameter—gray wrinkle finish, chrome-plated bezel.

HANDS: Black, with red sweep second-hand.

DIALS: 10" diameter—shows minutes, seconds and 2400-hour.
6" diameter — rotating inner dial, frictionally attached to hour hand, in red and blue; shows time directly in all time zones.

CRYSTAL: Convex annealed glass.

MOUNTING: Can be wall or panel mounted.

**standard 110-volt, 60 cycle; other voltages and frequencies on special orders.*

2400-hour time in every time-zone all over the world, right before you. Simply set hour hand and inner dial for your time-zone, read time in any zone easily, quickly, accurately.

Sold only through authorized dealers

Timing Devices Co.

EAST McKEESPORT, PENNA.

TIMING DEVICES CO., Manufacturers of clocks and electrical controls, now located in new modern plant, East McKeesport, Penna.

ELECTRONICS
TECHNICIANS
For
RADAR,
COMMUNICATIONS,
TELEVISION RECEIVERS
Needed By
RCA SERVICE COMPANY, INC.
A Radio Corporation of America Subsidiary For U. S. and Overseas

REQUIREMENTS:
- Good Character
- Training in Installation or Maintenance of Radar, Communications or Television
- Give Full Details of Practical Experience

Qualified Candidates will be Interviewed Promptly.

COMPENSATION:
Up to $7,000.00 a year to start—For Overseas Assignment—With Periodic Review of Base Salary Thereafter Made up of—
- Base Salary
- Overseas Bonus
- Actual Living and other Expenses
- Accident, Hospitalization, and Life Insurance
- Vacation and Holiday Pay

Qualified technicians seeking connection with leading company having permanent program for installation and service of military equipment, AM, FM, TV transmitters and receivers, and electronic devices, such as electron microscopes, mobile and microwave communications, theatre TV, write full history, to:

RCA SERVICE COMPANY, INC.
Camden 2, New Jersey

particles, and a "SID" may thus serve as a warning of impending aurora. Continuous signal-strength recording of a DX high-frequency station in the 5 to 10-mc range provides the best way of detecting these disturbances. WWV's signals may well be used for this purpose. The period of greatest disturbance usually preceeds the appearance of an aurora by about one to two days.

The Bureau of Standards has a well-equipped staff of scientists working on the problem of predicting magnetic and ionospheric storms. When they are convinced that conditions are sufficiently disturbed to warrant a "storm warning," WWV transmits a warning "W" during the time break at 19 minutes and 49 minutes after each hour. A "U" may be transmitted if conditions appear unsettled. These warnings are useful in predicting aurora, but sometimes they are not issued until after the "ham activity" portion of the aurora cycle has passed!

When an aurora is actually under way, radio signals can be received from any appropriately-located station by means of auroral rebound. It is suggested that the FM broadcast band, the lower TV channels or the ten-meter ham band might provide good signal sources. The Canadian Government is now operating a "beacon" transmitter under the call Y6R on 49.98 mc (although it seems to be getting closer to 49.99 mc). This station uses a non-directional antenna and vertical polarization.

Ham Observations

By making use of observations made on the ham bands during auroras we may be able to add a great deal to the store of knowledge about this subject. Accurate reporting of signal strengths and locations of stations contacted is important. Beam direction indications should be noted. In the past it has been assumed that one should simply point the beam north to get into the aurora. Of late several observers have found that this is not necessarily so. W8WRN, W2PAU, and others noted that during the opening of August 19 the best bearings were several degrees west of north. If both polarizations are available, test to see whether polarization effects are noted, or whether scattering is apparent. (There is good cause to believe that the signals retain their original polarization to a remarkable extent, considering how thoroughly everything else about the signals is altered by aurora reflection!) If you have a recorder, record some of the signals. There are gadgets now being designed which may be able to analyze the components of a complex signal and provide important information as to the nature of the effects which produced the aurora garbling. Reliable measurements of background noise will be valuable.

An Apology

It looks as though we've gotten so excited about this aurora stuff that we've just about run out of space. Not enough room left to include much six-meter news, or to air the few items on the 435-mc activity that we'd been saying! We'll try not to let it happen again! If you can get hold of a copy of the *RASO Newsletter*—all dressed up in its new format—your appetite for six meter news will be satisfied! Congrats, Perry. It's getting better every month. . . . At least we have space enough to pass along congratulations to W9ZHL. During an opening on July 26, Charlie worked W7JLV for his Nevada contact and a much-deserved 50 mc WAS!

Keep us posted, gang. 73

Brownie, W2PAU

MARS

(from page 33)

operation. Capt. Dan Jones, D4ADT, was her able assistant in getting the 28-mc r.f. into a folded dipole.

Merle's Titian blond hair does not belie her intenseness and drive. With her reserve commission as Lt. in the USNR and her new ticket she immediately applied for membership in MARS and enrolled in the radio mechanics' course at Scott AFB for a full six hours a day. She's studying theory and doing actual maintenance and is becoming as neat with a soldering iron as she used to be with a bridge deck.

General McBlain has not commented about being a radio widower, but no doubt he is wondering if the disease is catching.

YL'S FREQUENCY

(from page 44)

swer. That evening in Port Arthur (we had changed our original route to include that area) three stops at the QTH of W5DEW, Mary Palmer, produced only a good look at her 10-meter rotary. Then on to New Orleans where we didn't find W5PFE, Julia Kemker, at home, either. We did have a good rag-chew with her OM, W5NNH, though. Seems they had just celebrated their 15th wedding anniversary. For a present her OM bought Julia a new house and she was out decorating it. She has a Collins 32V-1 and as soon as they get settled in the new QTH she'll be on again with a new beam.

From New Orleans we went to Mobile and Pensacola and then north to Asheville. Here again we just missed out. Hilda Andrew, W4HWR, was due in Skyland (near Asheville) to visit her mother the day we passed through, but our schedule was too tight for us to wait. Though we couldn't see Hilda, we did talk with her mother. She is not a ham but is most interested and has an S-40 on which she can hear Hilda, but she added, "It's hard when a mother can't answer back!" Because of the war situation Hilda cut her vacation short and is now back with her OM at MacDill Air Force Base.

Finally in Washington, D.C., again, we spent a couple of days with Barbie, W3OQF, and her family. We were just in time, too, for the day after we left Dick, W3MAX, was driving Barbie and little Ricky to Key West where Dick was to work for six weeks. We had a good visit, comparing Kodachromes of Arizona with Washington, D.C., etc. but we got so tied up with sightseeing (the OM's first visit East) and with the National Congress of American Indians that we never did get to see any of the other YLs in D.C. Sorry, gals, and we hope you'll forgive us this time.

Morton, Pa., was the last stop before home grounds, where we stayed with Anabel, W3NNS, and Giff, W3AAW. After several earlier visits, QSOs on 10 and much correspondence, it seemed

Shown:
Bliley type MC-7

POLICE

SERVICES DEMAND QUALITY!

Yes, all mobile services demand dependable crystal performance. Bliley engineering skill plus craftsmanship throughout production is quality. Your frequency control will be better with Bliley, the top choice for 20 years.

Bliley
CRYSTALS

BLILEY ELECTRIC COMPANY, UNION STATION BLDG., ERIE, PENNSYLVANIA

like a second home! There was much to talk over of YL and YLRL business, and we also had a chance to visit with Marion, W3NHI, and Mae, W3CUL.

By the way, Anabel is very happy that her sister, Jeannette Ebur, has recently come up with her ticket and call, W3QPQ. Although Anabel has had her ticket for a number of years, and Giff for many, the bug didn't bite Jeannette until Anabel and Giff were visiting she and her OM a year ago, took them to meet local hams around Pittsburgh and evinced such enjoyment from hamming that Jeannette and Cliff invested in a 75A receiver. Cliff came up with W3PWQ last October but it wasn't until January when Jeannette found an XYL friend of hers was also studying that they both got down to serious business and were so interested in keeping each other encouraged that they couldn't quit. The friend, Kay Burke, had been exposed to ham radio for many years through her OM, W3AAX, and even before that by W3CF. It seems Kay was attending a state normal school across from Clarkson Tech. "It was a fad of the normal girls to knit while out walking," explained Kay, "and a chap from Tech, not to be outdone, was often seen winding something while strolling along. Upon inquiry I found that he was winding 200-meter radio coils!" This was W3CF, who was a pal of Kay's OM and the one responsible for getting him into radio. "During the years that Frank was exiled to the basement or attic, my interest was mostly one of irritation," adds Kay, "and radio seemed to be something which kept the OM up too late or got him up too early!" After the war, listening on ten, getting in on the Pittsburgh Weather Net sessions and finally working together with Jeannette supplied sufficient impetus to go after the ticket. "Jeannette and I are sporting a couple of swell c.w. calls," adds Kay. "On the Weather Net we are known as the 'Kewpie' twins —W3QPJ (that's me) and W3QPQ (Jeannette)." Incidentally, sisters W3NNS and W3QPQ, though their main interest is 10 phone are too close for QSOs on 10 so they're both getting good practice keeping skeds on c.w.!

SURPLUS PRICES SLASHED!

COMMAND EQUIPMENT
(274N, ARC-5, ATA)

Receivers	New	Used
190-550 KC		$12.95
1.5-3 Mc. . .		14.95
3-6 Mc. . . .	5.95	3 95
6-9 Mc. . . .	9.95	5.95
3-Rec. Rack .		.99
3-Control Head		.99

TRANSMITTERS

BC-696, 3-4 Mc.		$14.95
T-19, ARC5, 3-4 Mc. .		12.95
BC-457, 4-5.3 Mc.		3.95
T-20, ARC5, 4-5.3 Mc.	5.95	3.95
BC-458, 5.3-7 Mc.		3.95
T-22, ARC5, 7-9.1 Mc.	12.95	6.95

MODULATORS

BC-456	$2.95	$ 1.95
MD-7, ARC5, Push-pull .		8.95
SCR-522		$24.95
ARC-4 Xmttr-Revr . .		16.95
APN-4 Receiver		12 95
APN-4 Indicator . . .		17 95
APN-1 Xmttr-Rec. . .		6.95

APS-13 Xmttr-Rec. New	17.95
BC-645 Xmttr-Rec. New	12.95
ARB Receivers	24.95
BC-375 Transmitter	11.95
Tuning Units for above	1.95
BC-223 with 1 TU	49.50
ASB series Receiver	17.95
BC-929A Indic. New	15.95
BC-929A Indic. Used	6.95
APQ 2 HF Transmitter	19.95
RAX Receiver 200-1500 kc., 1.5-9 Mc. . . . . . . Each	15.95
RA-10 Receiver Models FA, DA . .	32.50
MN-26 C Receiver. New	18.95
MN-26 Y Receiver . .	14.95
BC-433 Receiver . . .	10.95
MN-20 E. Loop. New	6.95
D.U.1. Loop. New . .	19.95
BC-434 Control Box. New	1.49
ARN-7 Receiver . . .	12.95
C4ARN-7 Control Box	4.95
PE-237 Vibra-Pack 6, 12, 24, V, input. Output; 525 V. 095 A: 100V, 042A: 6.5 V, 2 A: 6 V, 5 A; 35 V, 450 A.	12.95

ESEGE SALES CO., LTD.
1306 Bond St. at Pico, Los Angeles 15, Calif.
TERMS: Cash with Order—Prices Subject to Change

Here and There

From Dot, W1FTJ, we hear that the 2nd "Down East" Hamfest held at Portland, Maine, on July 29th was again a successful affair. "We had a good YL turn-out," she comments, "and I counted W1HIH, MCW, MDV, MJE, MPP, QON, RYJ, SAJ, SRQ, and W2YTI. W1MPP defended her championship in the foot-sending contest, but lost to W3EIS. W1SRQ was in the competition too; incidentally, signed her up in YLRL." FB, Dot, and wish we could have been there, too!

Congratulations to W1QON on the birth of a jr. op on May 31st.

In the last column we commented that we'd be on our way back West by the time you were reading it. Publication schedules being what they are, it happens that we're still in N.H. while writing this present column. Early in August we took a few hours off from our jobs here and dropped in on the Estey's, W1MVX and W1MKM in Brattleboro, Vt. Long a friend of W1FTJ, we were glad to find W1MVX so close by. Dot and Ruth, by the way, not only share their hobby of ham radio, but also their hobby of raising thoroughbred cocker spaniels. Ruth and Paul are in the real estate business and they find it keeps them both on the run all hours of the day and evening. In between when they have time to spare they are on the air from a "shack" that would be the envy of most of us. A huge room, it has an immense picture window at one end overlooking a river, meadows and hills. At the opposite end is a big fireplace, on either side of which are their complete operating positions. And mounted on the walls are trophies of their earlier days of big-game hunting—heads of moose, caribou, elk, antelope, deer, skins of grizzly and black bear, etc. Both crack shots and fond of hunting, they used to go on pack trips in Mexico and Canada as well as in parts of this country. Now with their junior YL and their business hamming is their chief hobby. Licensed since 1940, W1MVX spends most of her time on 10 phone with a BC610 and HT18 with a 75A receiver and 4-element beam. W1MKM prefers c.w. and is on with a 32V-1, RME 45 with an HF 10–20, and a beam. Beautiful as their location is, they're talking about an "antenna farm" where DX would be easier to come by!

MONITORING POST

(from page 46)

tors: **W7OAQ, W8WWK, W8ZYI, KZ6EQ, KH6QH, W4OAZ,** and **W9IMP. IZA. KU1, DNR.** . . . **W1CQR, W2FG, W2JGA, W2EXM,** and **W8CBI** went in swimming recently; that's not a bit of news, except it is the first time in 40 years that these fellows took a dip together, as they did back in the old spark days; they still can be heard regularly on 7 mc pounding out Morse. . . . **W5GZM** does very well with a quarter-wave

When writing to our advertisers say you saw it in CQ

Good News For Hams!

UP GO VALUES, DOWN GO PRICES ON NEW & SURPLUS HAM GEAR

CRYSTALS Low Freq.

FT-241 A holder ½" pin spacing, for ham and general use, XTAL control, Signal Generator, marked Army Mc. harmonic frequencies—Directions for deriving fundamental frequencies enclosed. Listed below by fundamental frequency, fractions omitted.

412	426	442	475	493	504	516
413	427	443	477	494	506	518
414	429	444	479	495	507	519
415	431	445	481	496	508	522
416	433	446	483	497	509	
418	434	447	484	498	511	
419	435	448	485	503	515	
420	436	462	487			
422	437	468	488			
423	438	472	490			
424	440	473	491			
425	441	474	492			

each **49¢** 10 for $4.50

372	381
374	383
375	384
376	386
377	387
379	388
380	

each **39¢**

390	401
391	402
392	403
393	404
394	405
395	408
396	409
397	411
400	

each **79¢**

450	531.944
452.777	533.333
461.111	536.111
464.815	537.500
465.277	538.888
526.388	
529.166	
530.555	

each **99¢**

Frequency Standard
98.356 kc
3-pr. holder
$3.98

Special 200 kc. Xtals without holders 21-32" space x 23-32"

69¢ each
3 for $2.00

HAM CRYSTALS

FT-243 holders—½" pin spacing, for ham and experimental use, fractions omitted.

4190	6173	7806
5030	6206	7840
5485	6208	7873
6006	6773	7906
6040	6840	7925
6073	6873	7973
6075	6906	8240
6100	6973	8273
6106	7740	8306
6140	7773	

each **49c**
10 for $4.50

3735	5850	6425	6806	7573
5305	5873	6440	7306	7640
5677	5875	6450	7340	7673
5700	5900	6473	7373	7706
5706	5906	6475	7406	7806
5740	5925	6506	7440	8173
5750	5940	6540	7473	8340
5760	5973	6573	7506	
5773	5975	6606	7540	
5775	6273	6640		
5806	6340	6673		
5825	6373	6705		
5840	6406	6740		

each **99c**
10 for $9.00

SCR-522 XTALS

5910	6610	7580
6370	6750	7810
6450	7480	7930
6470		
6407.9		
6522.9		
6547.9		

each **$1.29**

BC-610 XTALS

2 Banana Plugs ¾" spc.

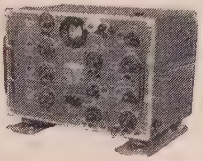
2045	2260	2415	3215	3570
2105	2282	2435	3237	3580
2125	2300	2442	3250	3945
2145	2305	2532	3322	3955
2155	2320	2545	3510	3995
2220	2360	2557	3520	
2258	2390	3202	3550	

each **$1.29**

Payments must accompany order. Enclose 20¢ for postage and handling. Minimum order $2.00 plus postage. Crystals shipped packed in cloth bags inasmuch as they are shock mounted. All shipments guaranteed.

Reduced for Clearance

BENDIX 100 WATT TRANSMITTER



One switch used to change 10-20-40-80 meter bands.

FOUR SEPARATE ELECTRONIC COUPLED OSCILLATORS: these can be easily converted to 20-40-80 meters. Crystal required for 10 meters. Each electronic coupled oscillator dial has 3000 divisions enabling quick precision shifting. This transmitter was constructed of the highest quality of precision parts, with laboratory precision. Four separate output tanks; one 4-position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. All the controls are mounted on the front panel. The housing is cast aluminum; shields and case are sheet aluminum. Dimensions: 11 x 12 x 15 inches, weighing 35½ lbs. Complete, simple instructions for conversion furnished. Uses three 807, four 12SK7 tubes, one 2-inch 5-amp. R.F. meter.

A complete coverage transmitter, for the new or experienced amateur.

A TRUE HAM VALUE complete with tubes was $49.95

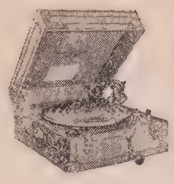
Now-Only $29.95 Like New | **$19.95** Used

CLEARANCE OF ALL SURPLUS!

Only a few of each item left . . . hurry, hurry, hurry for the best buys and biggest savings!

NAVY VHF Brand New CW TRANSMITTER

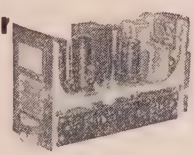
Battery operated (67½ V. "B" and 1½ V. "A") Frequency 80 to 105 M.C. Uses 2 1G4 Tubes—with Instruction manual—less tubes and batteries **$4.95**



G. I. Portable Wind Up PHONOGRAPH

Heavy duty spring motor. Plays 3 records on 1 winding — Packed with 100 needles —Brand New **$9.95**

Elevator Servo Amplifier



with 2-1632 1-1633, 1-1634 tubes. Many mica and bathtub condensers, resistors, transformers, rotary switches, volume control, etc. With diagram. **$3.95**

Brass Reflex Speaker Cabinet 15" utility model—Reg. $34.50 — Reduced to **$24.95**

Antenna Relay Units BC-442 with Vacuum Capacitor and RF Meter **$2.89**

High Voltage Triplet DC. Voltmeters—125 Ohms per Volt—With External Multiplier—Brand New!

VOLTS	2" PRICE	3" PRICE
600	$2.95	$3.95
1000	3.49	4.49
1500	3.49	4.49
2000	....	4.49

Famous Make Butterfly Condensers All New—At 1/3 off Regular Net Prices. Not Many Left.

.500 GAP		.375 GAP		.250 GAP	
77	$19.20	11	$ 8.15	13	$ 7.95
87	20.65	45	12.90	95	15.40
96	22.15	82	17.20	111	16.80
105	23.80	106	20.15	127	18.25
115	25.20	130	21.60	143	19.85
124	26.65	141	24.50	159	21.00
		153	25.95	175	22.50
				192	23.95
				208	25.95

Note: figure in left column is max. cap. per section

Nationally Known Famous Make Heavy Duty Single & Double Stator Transmitting Condensers.

MAX. CAP.	GAP	PRICE	MAX. CAP.	GAP	PRICE
300	.077	$ 5.32	200-200	.077	$ 6.58
230	.171	5.57	100-100	.219	14.11
500	.219	17.22			
250	.219	12.85	60- 60	.344	13.41
75	.344	8.96	100-100	.344	15.64
245	.344	14.11	60- 60	.469	14.11
50	.359	3.89	30- 30	.719	12.99
50	.469	7.05			
100	.469	11.62			
150	.469	12.95			
75	719	12.85			

OHM METER Weston 689

A beautiful instrument for accurate work, Scale 0-10 ohm and 0-1000 ohm scaled to read 1/20 of an ohm with ease. This 2¼" round meter is housed in a black bakelite case 1¾" x 2¾" x 5". Complete with heavy duty felt-lined leather case and lock, Brand New **$9.95**

Filter Choke—2 HY-60 MA Hermetically Sealed **49¢**

Antenna — 150 MC Tapered Rod with Coax Fittings for mobile use **$1.95**

Cathode Ray Tube—5 BP4 **$2.50**

SUN RADIO

OF WASHINGTON, D. C.

938 F STREET, N.W. WASH. 4, D. C.

TERMS: All items F.O.B. Washington, D. C. All orders $30.00 or less, cash with order. Above $30.00, 25 percent with order, balance C.D.D. Foreign orders cash with orders, plus exchange rate.

Columbia
GEM OF THE SURPLUS

COLUMBIA'S GEM OF THE MONTH
APN-1 ALTIMETER TRANSCEIVER
Easily converted to AC for 420 ham band. Also has parts for TV sweep generator with use of wobulator. Can be modified for citizens' band. Excel. cond. Complete: $3.49
Schematics for above. Ea. .... 95¢

bC 229 ARMY VERSION RU16 & 19 RECEIVER
Complete with tubes and 1 tuning unit. Freq. from 200 to 12,700 KC. Makes good marine receiver. Near New condition. $4.50

T-24/ARW3 TONE TRANSMITTER
Was used to control radio target. Has tone oscillator. Very easily converted to 10 or 6 meter mobile. Has oscillator and double stages with 807 final. Complete with tubes and 24 V. dynamotor. Fair cond. $17.95

TUBES! TUBES!! TUBES!!!!
ALL NEW, BOXED!

811	$2.95	1625	$ .35
813	7.50	8012	1.19
6AK5	.89	829B	4.50
6AG5	.89	832A	3.95
6J6	.89	6SN7	.99
717B	.79	2D21	1.09
		5BP4	1.75

YER BEST BETS IN HEADSETS!
HS-38 2,000 ohm. New. $1.75
HS-23 4,000 ohm. New. $2.95

R-89/ARN-5 GLIDE PATH RECEIVER
Makes good FM receiver. Used, cond. $4.95

W.E. 188-A CONDENSER
.1 to .0015 in same case. FB for audio oscillator. New, boxed. 3 for only $1.29

ARC-5 OR ATA 274N TRANSMITTERS—Complete!

2.1-3 mc. New	$12.95
3-4 mc. Excel. cond.	9.95
4-5.3 mc. Excel. cond.	3.50
5.3-7 mc. Excel. cond.	3.50
7-9.1 mc. Excel. cond.	9.95

ARC-5 OR ATA 274N RECEIVERS

0.190-.550 mc. Excel. cond.	9.95
0.520-1 50 mc. Excel. cond. Broadcast band	22.50
1.5-3.00 mc. Excel. cond.	14.50
3.00-6.00 mc. Excel. cond.	3.95
6-9.1 mc. Excel. cond.	9.95

METERS! METERS!

0-1 amp. R.F. 2" rd. G.E.	$2.99
0-8 amp. R.F. 2" rd. G.E.	2.98
0-25 MADC 2" rd. Weston	2.49
0-100 MADC 2" rd. Westinghouse	3.29
0-500 MADC 2" rd. G.E.	3.49

ANTENNAS!
PE103 DYNAMOTOR
6 & 12 V. input; output, 500 V. @ 160 mils. Ideal for mobile. Excel. cond. $15.95

AFQ-5 POWER SUPPLY: Electronically controlled power. Embraces 2-5U4G, 4-6Y6, 2-VR150, 1-6S17, 1-6X5. Operates from 115 V. 400 cycle. Replacing xformer with 60 cycle. Makes ideal lab or test supply Excellent cond. .... Ea. $4.95

BC 1072 TRANSMITTER
157-187 mc. Complete with 10 tubes, 1.5 amp general radio variac, 110 VAC blower, 110 VAC 60 cy. power supply with 3½ in. 0-5 kilovoltmeter. Excel. cond. $19.50

RG8U COAX CABLE
52 ohm. New. Per 100 ft. $4.95
Per ft. .... 6¢
BC624 RECEIVER: for SCR 522. Slightly damaged. $8.95
BC625 TRANSMITTER: for SCR 522. Slightly damaged. $8.95
TRANSFORMERS: 115 VAC 60 cy. 5 V. @ 10 amp with 50 W. socket mounted on top. Good cond. $8.95

COLUMBIA ELECTRONICS SALES
Dept. LS—
522 S. San Pedro St., Los Angeles 13, California

vertical antenna on 7 mc—he lives in a trailer. . . . On the staff at WNBK-TV are **W8LEX, FP,** and chief Op **EGZ.** . . . **W5EGZ,** who used to keep the Naval Reserve station at Little Rock, Ark., rather busy, is now in New Orleans.

VE1BK and **VE1HT** are again active on 7 mc after several months layoff. . . . **W8WYE** enjoys TVIless operation on 75—not even in his own TV receiver can any disturbance be noted while he operates his rig. . . . **W8MF** is on the air again after a 30-year absence; licensed as **8LF** in 1913, he served in the Navy during the first World War.

SCRATCHI

(from page 6)

much cactus juice, then Scratchi steering conversation around to new beam. Hon. Ed., you could knocking me over with six-foot relay rack when he telling me he building antenna for new television receiver so can getting Feenix TV station which are 125 miles away.

At this point Scratchi are deciding enough is too much, and I are making survey of Arizona hams. I getting girl friend Lil to sending postcards to all Arizona hams, asking them if they on air or if having television set. Result of this survey are showing that every ham who having TV set are not on air. (Are only getting three answers so far, but are sure rest will be just the same.)

Now it is up to you and to Scratchi to saving hams of America from fate worse than death. Because I know that you joining this worthy cause you will finding membership card enclosed. You are Charter Member #2. Scratchi deciding not to have any dues, but, Hon. Ed. there will be certain expenses Scratchi will be having, and I are certainly that you will want to kicking in with small donation to this worthiest of all Hon. Causes. If you can sending fifty bux post-hasty Scratchi will getting things underway on national scale.

One idea I having is that maybe we could convince the FCC to not issuing licenses to hams with television sets, or making hams with television sets paying twenty-five dollars a year for ham license, while if not having TV set not paying any license fees. Of course, this maybe not working out, but you are having good push and pull in Washington, so you can taking ball from there. What you thinking, Hon. Ed? shall we banding together to wipe out the evil of TV?

Respectively yours,
Hashafisti Scratchi

P.S. Say, if I are buying TV set, just to finding out how bad an influence they are, would you recommending I getting set with 16 or 19 inch tube?

FP8AC

(from page 32)

but a huge accumulation of DX Hogs prevented any scheduled QSOs. Threats of a blacklist did no good at all. For every ham that quit calling, five more would start up. Verily, from listening to some of them carry on, I would swear they had lost their marbles! I realized that a crucial moment had

HARVEY *for the new, the tried, the true*

JUST ANNOUNCED!!

COLLINS 1 KW XMTR

To be available about March 1951. Price will be in range $3000-3500. Get your order in now to be one of the first to get this outstanding new rig.

SUPERIOR POWERSTATS

Smooth, efficient, voltage control, 0-135 volts output from 115 volt AC line. Models also for 230 volt input. Write for free literature. Models for table and panel mounting.

Type 20, 3 amp	$12.50
116, 7.5 amps, table mtg.	23.00
116U, 7.5 amps, panel mtg.	18.00
1126, 15 amps	46.00
1156, 45 amps	118.00

NEW COLLINS 75A-2

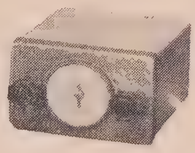
Double-conversion superhet with sensational stability, calibration accuracy and sensitivity . . . all the good features of the 75A-1, plus many new ones. Price, complete with tubes **$420.**; matching 10-inch speaker **$20.00.**

ANTENNAS

Complete line of **Premax** and **Master Mount** antennas and mounts carried in stock at all times. **All Hy-Lite** 6, 10, 20 meter beams as well as TV Yagis always in stock.

GON-SET CONVERTERS

3-30 Gon-Set Converter; 10-11 Gon-Set Converter; 20 meter Gon-Set Converter; 75 meter Gon-Set Converter. *Shpg. Wt. ea. 4½ lbs. each,* **$39.95**



Gon-Set Noise Clipper, *Wt. ½ lb.* **$8.25**

NEW Gon-Set Tri-Band Converter **$42.50**

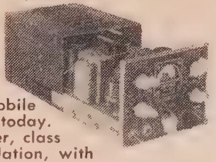
NOTE: In view of the rapidly changing price situation in both complete units and components we wish to emphasize that all prices are subject to change without notice, and are Net, F.O.B., N.Y.C.

ANTENNASCOPE

Now you can be sure of maximum antenna performance with this Antennascope based on design of W. M. Scherer, W2AEF published in CQ, September. Used with a Grid-Dipper, you can measure radiation resistance, resonant frequency of antenna, line impedance, receiver input impedance, feedline s.w.r. Reduce TVI, increase xmttr efficiency, improve receiver performance, by knowing and measuring your rig. Eldico Antennascope is available in kit form or completely wired and tested.

Kit form .... **$24.95**; Wired and tested **$29.95**

THE NEW SUBRACO MT 15X

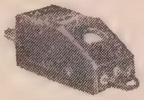


The finest in mobile rigs available today. 30 watts power, class B 100% modulation, with push-to-talk and built-in coaxial type antenna relay. Xmttr complete with tubes, coaxial antenna connector, mounting brackets, etc. *Shipping weight 15 lbs.* **$87.50**

MT15X for 20 meters $87.50

SUBRACO D5400

Dynamotor supply. 6V. DC input, 400 V. at 175 ma. output. Complete with built-in control relays, filter, etc. *Shpg. Wt. 10 lbs.*............... **$79.95**



MILLEN 90651

MILLEN GRID DIP METER

Ready to go .. **$55.00**

Telephone: LUxemburg 2-1500

hrc

HARVEY RADIO COMPANY INC.

103 West 43rd St., New York 18, N. Y.

ELDICO PRODUCTS

NEW IMPROVED GRID DIP OSCILLATOR KIT

The most valuable piece of test equipment in the ham shack is the Grid Dipper. Build one with this kit and save countless hours in building, improving and de-bugging your rig. The GDO Kit builds an exact duplicate of the "Grid Dipper," now with regeneration. Includes everything from the special handy case permitting one-hand operation down to a complete application and instruction book. With tube and internal power supply, range 3 Mc to 250 Mc in 6 steps, size 5½" x 2⅜" x 3".

Complete Kit $24.50

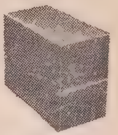
Eldico TVT-62 low-pass filter, kit.	**$7.99**
Wired and tested	**$10.99**
Eldico TVR-300 for Twinex or TVR-62 for co-ax, high-pass filter, kit	**$1.98**
Wired and tested, either type	**$3.98**
Brute Force line filter, kit	**$5.98**
Wired and tested	**$8.98**
Copper mesh shielding, 36" wide, min. order 6 sq. ft., per sq. ft.	**$.85**
plus $.50 per order for packing.	
TR-1 transmitter kit	**$199.50**
TR-75 transmitter kit	**$44.95**
MD-40, 40-watt modulator kit	**$34.95**
MD-40-P, same with power sup.	**$44.95**
MD-100, 100-watt mod. kit	**$49.95**
Wired and tested	**$59.95**

ELDICO HIGH VOLTAGE POWER SUPPLY KITS

Kit No.	Output	Price
HV-1500	1500 v. 350 ma.	$39.50
HV-2000	2000 v. 500 ma.	79.50
HV-2000SP	2000 v. 700 ma.	95.95
HV-2500	2500 v. 500 ma.	99.95

ELECTRONIC BUG AUTOMATIC DOTS AND DASHES

EE-2



EE-1, kit form	**$21.95**
Wired and tested	**$27.95**
EE-2, with integral monitor, Kit form	**$29.95**
Wired and tested	**$39.95**

Write for

FREE

TVI BOOK

When writing to our advertisers say you saw it in CQ

RCA Two Names You Can Depend Upon

HUDSON
RADIO & TELEVISION CORP.

★ **RCA for Top Quality Equipment!**

★ **HUDSON for Best Value—Dependable Service!**

New Giant Store and Warehouse features a Complete Line of RCA Equipment . . . Tubes, Batteries, Test Equipment and Parts . . . for Immediate Delivery or Shipment to All Parts of the World!

NEW! RCA 515S2
15" Duo-Cone SPEAKER

The newest development of Dr. H. F. Olson, RCA's renowned speaker authority. Delivers 25 watts of high fidelity audio over range of 40-12,000 cycles. Has two voice coils, each driving one of the duo-cones which vibrate as a single cone, at crossover frequencies (around 2,000 cps), avoiding "crossover" interference. 2 lb. Alnico V magnet. Performance is amazing! 18 lbs.

No. A53, RCA 515S2 Speaker Net **$48.50**

RCA Model 515S1,
15" Speaker, No. A52....Net **$35.57**

RCA WV-97A
SENIOR VOLTOHMYST

The WV-97A has a range of usefulness far beyond any other instrument in its field! The Senior VoltOhymst measures dc voltages in high impedance circuits, even with ac present. It reads rms value of sine waves and peak-to-peak values of complete waves or recurrent pulses, even in presence of dc. Includes direct probe and cable, dc probe, ohms lead, ground lead.

No. A14..............................Net **$62.50**

RCA TELEVISION COMPONENTS

All RCA Television Components are "originals," with characteristics which are correct electrically and mechanically for the tubes and circuits. They are "performance" proved, competitively priced!

RCA INDUSTRIAL TUBES

RCA's unparalleled facilities, background, and experience contribute to the quality, dependability, and operating economy of EVERY RCA tube you buy. The Quality of RCA tubes is Unquestioned!

FREE OUR NEW 1951 CATALOG

Your Name and Address to Dept. 10X on a Postal Card Will Bring Your Copy!

HUDSON
RADIO & TELEVISION CORP.

212 FULTON STREET
NEW YORK 7, N. Y.
Digby 9-1192

Most Complete Stock of Radio, TV, Electronic and Sound Equipment in the East!

arrived. I either had to get huffy and QRT for the evening, or else forget the sked temporarily and take on all comers. There was no middle course. Remembering all the times that I had been on the "other end," I didn't have the heart to QRT, so I went ahead and worked the stations as they came. To those who were disappointed by the failure of the skeds, I sympathize but offer no apologies. If you with to blame someone, blame your fellow ham. To those who broke up the skeds, I hope you realize that you prevented many a low-powered ham from getting a new country.

As the days went on, however, the pile ups thinned out, and by the last few days, a timid CQ could be called without a reply at all. However this did not happen many times!

It was planned to work fone during the trip, and VE1CR kindly donated a 6L6 modulator and microphone to the expedition. During the evening hours, when the a.c. was available from the hotel inverter, the BC-348/310B combination was used. A 250-foot extension cord and two Variacs were used to bring the 110 volts to the hotel room. In spite of the two Variacs, the a.c. voltage would wander between 150 volts and 70 volts. When the QRO of 30 watts was keyed the voltage would drop 20 volts or so. Phone operation was virtually ruled out when it was found that the additional drain of the modulator dropped the a.c. supply to slightly over 60 volts. An extra 12-volt filament transformer was pressed into service as an autotransformer and the phone rig finally went on the air—after a fashion. A tri-weekly phone schedule was held with VE1CR; FP8AC operating on 3512 kc fone. During the stay, over a dozen VE1s were worked on 80-meter phone, and many Ws (as far away as W9) were heard. No Ws were worked on phone as the piece of wire that served for an 80-meter antenna refused to load above 3600 kc and the W phones did not tune down to the c.w. band. PA0RZ was worked for the only European QSO on 3.5 mc.

A large and happy contingent of W hams was found on 3.5 mc, all of whom acted as perfect gentlemen. Quite a difference from 14 mc! First W QSO on 3.5 mc was with W4NNN, followed by W1AQE, W1BBN, W2PEO, W4BRB, KV4AA, and W2WC.

The eightly-meter band was jammed up with commercial signals that made operation rather difficult. The same was true with 20-meter phone, a loud, clicky Russian commercial being smack in the middle of the band. W8QUL and W0PUE provided the first two-way phone QSOs on 14 mc. Phone operation was tried several nights on 14,255 kc. A few stations were worked with good reports both ways, but much time was wasted in fruitless CQs. I guess the phone men were too busy exchanging "handles" to bother with FP8AC.

Forty meter operation was planned, but given up when the 7.0-mc doublet was found to be left at home! The 80-meter wire and the 20-meter doublet both refused to take power on 7.0 mc, so this band was regretfully crossed off the list.

The "skip" on 14 mc was predominantly European. W6, W7, and VE7 stations were heard with a hollow ring on them, just as we used to hear Europeans from home. The west coast would start to come thru about ten pm. Unfortunately at the same time, two other things would start to happen: The band would start going dead, and the a.c. inverter would be on its last gasp, spewing out a measly 70 volts or so. Consequently there was only a period of 45 minutes or so when the west coast was workable. During this time, contacts were squeezed in with KH6VP, KH6CT and KH6BA for the only Oceania QSOs.

Towards the end of the second week, a message was received from W3JNN that W3BVN would arrive by airplane shortly, and operate as FP8AF. I hurried down to the airport and met "Lit" and escorted him back to the hotel. His original thought had been to take his pee-wee battery powered transmitter to the top of a hill and operate from there, but the raw wind and fog that swept in from the ocean at night put an end to this idea. He compromised by setting his station up in the hotel, at the opposite end of the hall from our room. He ran his end-fed Zepp out over the hotel yard to a chimney on a small house. The 3-watt job was an instant success. 14,020 instantly had a huge pile on it calling FP8AF, while FP8AC sneaked downstairs to partake of a quick game of bridge (in French!). Incidentally, FP8AF gave FP8AC his first FP8 QSO! I was very happy to get that rare one!

As the days went on, FP8AF found it increasingly difficult to work out. A QRO to five watts did not help a bit. Finally, just before he was ready to leave, we found out what was causing the trouble. The small building to which he had attached the free end of his antenna was a cement block factory. Each day's production of wet cement blocks was carefully stacked under his antenna at the close of day, and each day the pile grew higher, foot by foot. We did not notice this phenomenon until the pile was large enough to reach within five feet or so of the antenna! "Clearly a case of an advancing ground level, raising your radiation angle," said FP8AC to FP8AF as he took a sip of his orange cordial.

* * *

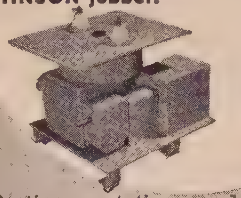
Back in the dear, dead days of 1936 or so there appeared a raspy signal signing F2PX and later FP8PX, claiming to be located in the Miquelon Island group. Upon arriving in St. Pierre I tried to substantiate this story; to find out if there really had been any legitimate amateur activity before the war from FP8. Yes, FP8PX was real, and he was located in the town of St. Pierre. I was fortunate to meet Paul Detchverry, the operator of this station and to get his story.

It seems Paul had been a radio operator either on a ship or at the shore station, and had become interested in ham radio. He procured a FB-7 receiver and built up a Mesny transmitter using two 210 tubes. He was active for a short period of time, then because of interference with some trans-atlantic circuits his station was closed down by the government and his equipment confiscated. Paul is still an ardent ham, and very much interested in getting back on the air. The Southern California DX Club is making arrangements to send him complete equipment to get him on 14 mcs at an early date. So soon there

A Superior Rotator

Illustrated is the husky JOHNSON RotoMatic rotator, ideal for chasing DX. Heavy steel gears, truly weatherproof construction and positive lubrication make it a dependable all weather performer.

Write for catalog 704 describing all RotoMatic components or see your JOHNSON jobber.



Features

- Continuous rotation
- Noiseless slip rings
- Instantly reversible motor
- Tilt base
- Selsyn direction indication
- 1200 to 1 gear reduction
- Positive locking
- Speed 1½ RPM
- Safely handles 2½ KW
- Lifetime "oilite" bearings

E. F. JOHNSON CO.
WASECA, MINNESOTA

go mobile! APPROVED! ACCEPTED!

Master Mobile
ANTENNAS MOUNTS
Sold at all Leading Distributors or Write:
MASTER MOBILE MOUNTS, INC.
5200 Wilshire Blvd., Los Angeles 36, California

AMATEURS WITH TEST EQUIPMENT

The present emergency requires putting back into service both military and laboratory quality commercial test equipment. Interested in any TS, I, BC or other good pieces. Critically need TS-34's, TS-100's, TS-174's and any I-208's, plus gear made by Boonton, General Radio, Stoddard, etc. Please communicate giving full nomenclature and serial numbers. Describe condition with your lowest cash price.

WESTON LABORATORIES
Weston 93, Mass.

Broad Band Ten Meter Converters .... $16 Postpaid

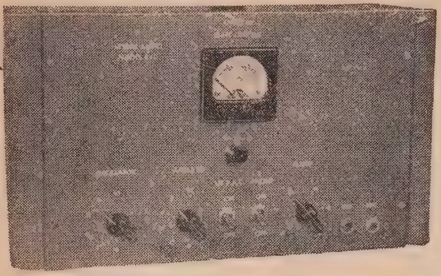
These RF24 three tube units really perform. Peps up your set immeasurably—especially such models as the BC-348, BC-342, etc. Actually covers 20-30 MC—output 7.5 MC—measures 5 x 7 x 10½ Spare tubes, coax fittings and instructions furnished. Needs no alteration to perform. Requires 200-250 V 18 MA—6.3 V at 2 amp. Used but guaranteed to work.

THE OVERBROOK COMPANY
Overbrook 81, Mass.

BUY OF A LIFETIME

TRIED AND PROVEN THE WORLD OVER

LETTINE MODEL 240



This beautiful transmitter originally sold for $98. Buy it direct from our factory for only $69.95, complete with instructions for TVI reduction. Even if you already have a transmitter of your own, this rig makes an excellent standby. You can't afford to miss this opportunity.

The 240 is a complete 40 watt Phone-CW rig, working all bands from 160 to 10 meters; complete with (8 x 14 x 8) cabinet, self contained power supply, meter, tubes, crystal and coils for 40 meters. Tube line-up; 6V6 osc., 807 final, 6SJ7 mike amp., 6N7 phase inverter, 2 6L6s mod., 5U4G rect.—weight 30 lbs.—90 day guarantee. PRICE **$69.95** $20 deposit with order—the balance C.O.D.
Coils for 80, 20 and 10 meters $2.42 per set. Coils for 160 meters $3.00.

LETTINE RADIO MFG. CO.
62 Berkley St. Valley Stream, N. Y.

ATTENTION
MOBILE HAMS

COMPLETE MOBILE PACKAGE — NOTHING ELSE TO BUY. OUTSTANDING MOBILE SIGNALS USE MOTOROLA EQUIPMENT — BACKED BY YEARS OF COMMUNICATION EQUIPMENT EXPERIENCE — WORLD'S LARGEST PRODUCER OF 2-WAY MOBILE EQUIPMENT.

A mobile transmitter with a double feature FM or AM at flip of the switch, the MOTOROLA FMT-30-DMS 27-30 MC. **$130.00**

P-7253 spring base rear-mount antenna **$22.50**

MOTOROLAP-69-13or18-ARS receiver with special noise limiter for use with any converter having 1440-3000 KC . . . **$60.00**

New Gon-set Tri-Band Spread Converter **$42.50**

3-30 famous Gon-set converter complete to connect to the P-69-13 or 18-ARS receiver **$39.95**

P-327-E Fire wall loud speaker **$5.00**

The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

NOTE: This Receiver and Transmitter is equipment which has been returned from the field, modified and rebuilt for Amateur Service.

For further information write to:

MOTOROLA INC.

Amateur Sales Dept. CQ October
1327 W. Washington Blvd., Chicago 7, Ill.
Attention: Harry Harrison W9LLX
Telephone—Taylor 9-2200 Ext. 161

will be a real FP8 on the air—permanently!

In conclusion I wish to thank the many kind friends who helped to make this trip so pleasant. Reg Rogers, VE1CR who so kindly lent me modulation equipment and drove miles to pick us up from the boat on our return trip. . . . Monsieur F. X. Campagnon who authorized the operation of FP8AC . . . Monsieur Dagort, who let me use his 110-volt inverter. . . . Monsieur F. Leroux a "wonderful guy." . . . Monsieur Henri Paturel, chief Engineer of FPN, all of them make the adventure of FP8AC a wonderful memory that will remain with us always. To them, our kindest thanks and may we meet again!

RECEIVER

(from page 18)

If "birdies" are encountered within the range of the basic tuner, they are probably due to harmonic leakage from the synthetic carrier oscillator. They can usually be eliminated by improving the bypassing, although severe cases may require re-routing of leads or added shielding. The usual procedure of placing a test by-pass condenser from power leads to ground, moving leads, and placing shields in various positions should be tried.

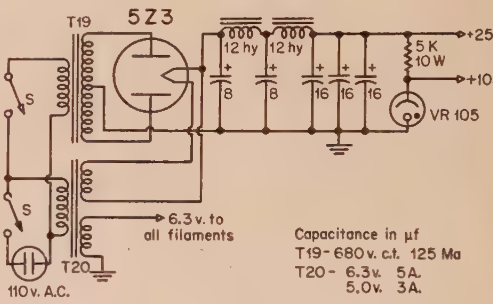


Fig. 8. The circuit of the power supply.

"Birdies" on the higher ranges will almost certainly be due to harmonics of the high frequency oscillator. In addition to the above procedure for elimination, removing turns from the oscillator feedback winding and reducing the size of the oscillator grid resistance may help in eliminating them.

Complete the receiver by preparing a dial calibration, either by a curve, or directly on the dial face.

Operation

It is best to spend some time in listening before attempting to carry on a QSO using the receiver, since usual tuning habits will have to be modified somewhat. Also, it is suggested that the 80-meter band be used at first, largely because the signals there are generally of better quality, so tuning is easier.

The most important point to watch in tuning is to keep the r.f. gain low. Excess gain gives poor sideband rejection, makes signals appear broad, and makes heterodynes more annoying. Don't worry about missing stations—a phone signal which is too weak to be read through noise will still produce an audible heterodyne.

At first, it will be helpful to set the selector switch to receive both sidebands. Turn up the r.f. and audio gain until noise or signals are just audible, remembering to keep the audio gain relatively high and the r.f. gain relatively low. Tune slowly across the band.

For a.m. or p.m., as the receiver approaches the signal, a faint, high frequency heterodyne will be heard first. As the signal is approached more closely, the heterodyne will become louder, and of lower frequency. As it becomes sub-audible, at about 100 cycles, badly distorted modulation will be apparent. The distortion will become less as the tuning is changed further, and disappears entirely with the local oscillator frequency the same as the carrier. Thereafter, for small changes in tuning, the local oscillator will remain locked to the carrier, and the signal will remain perfectly readable. For larger changes, however, control will be lost, and a heterodyne will again appear.

If one of the sidebands shows QRM, it will appear as a heterodyne, which can be reduced (or eliminated, if not too strong) by selecting the other sideband. Modulation from the QRM can sometimes be heard, particularly if close to the desired signal, but will generally cause no trouble, since it appears inverted or scrambled, and so is not misleading.

It will be immediately evident that the signal seems to approach via one speaker and leave by the other. When perfectly tuned in, it is difficult to determine the apparent source of the signal. More than anything else, it seems to be located half-way between the listeners ears, and, with fading to move from one ear to the other. QRM, however, always seems to be off to one side. Even if both sidebands show QRM, so that the sideband selection does not eliminate the heterodynes, it is easy to listen to only the signal desired. The effect is similar to listening to one person in a roomful of conversation.

Note that there is no difference in tuning for a.m. or f.m. In fact, if the signal is of good quality, it is not possible to tell which system of modulation is in use.

It will be found that ignition noise is much less troublesome than with a conventional receiver. This is due to the large local carrier, which tends to prevent overload on noise peaks. However, poor locations may make an i.f. type of silencer necessary.

Tuning for c.w. signals is similar, except that zero beat is avoided. The audio image can be rejected by operation of the sideband selector switch. The ease with which this can be done greatly surpasses the setting of the rejection notch of a crystal filter, and permits rapid retuning to the other side of zero beat when QRM sets down close to the desired signal.

The usefulness of this receiver for c.w. reception could be improved by placing a switchable filter in the audio amplifiers. The old tuned impedance system, a Selectoject, Hetrofil, or even a radio range filter would do.

(*QSY to p. 66*)

Bargains . .

NEW and USED SURPLUS EQUIPMENT

SCHEMATICS

BC-683 Receiver	$ .75
BC-788 Transceiver	.50
RT-7/APN-1 Altimeter	.50
T-23/ARC-5 VHF Transmitter	.50
R-28/ARC-5 VHF Receiver	.50

THIS MONTH'S SPECIAL
BC-604 Transmitter 20-28 MCFM
1 for $9.95 2 for only $10.00

BC-929 3" Scope Indicator—New	$17.50
RT-7/APN-1 Transceiver	3.95
BC-906 Frequency Meter 150-225 MC	6.50
MD-7/ARC-5 Push-Pull Modulator	7.50
MP-22A Antenna Mast Base	2.50
RL-42B Reel Motor with Gear Box	1.25
BC-453B Receiver 190-550 KC	14.50
FT-234 Single Transmitter Rack	1.00
BC-457 Transmitter 4-5.3 MC	4.95
BC-458 Transmitter 5.3-7 MC	4.95

BC-746B Tuning Unit with 2 Crystals 75c
5 for $2.50

HS-38 Low Imped. Head Set—New	$1.00
HS-16 High Imped. Head Set—New	1.00
T-30 Throat Microphone	.35
M-299 Microphone Adapter	.50
BC-334 Switch Box	.50
T-17 Microphone	.75

Tuning Units for BC-375
$1.00 Each - - - - 5 for $4.00

Tuning Knob for BC-348	$ .10
50,000 OHM Audio Taper Volume Control	.20
3,000 OHM Sen. Plate Relay—TPST	.49
Isolantite Coil Form 2½" high, 1⅛" dia.	.15
Double Pole, Double Throw Antenna Switch	.50
Ceramicon Padder Cond. 4.5-25 MMF	.20
3,000 OHM Volume Control	.20
60 OHM 1.4 Amp. Power Rheostat	.50

RESISTORS — 15c Each

500 OHM, 10 Watt	2 OHM, 5 Watt
100 OHM, 10 Watt	12 OHM, 20 Watt
700 OHM, 10 Watt	75 OHM, 20 Watt
4000 OHM, 10 Watt	15 OHM, 25 Watt
10000 OHM ,10 Watt	5 OHM, 100 Watt

Output Trans. Single Plate to 500 or 2000 OHMS	$ .50
MC-385 High to Low Trans. for HS-33	.25
FL-5 Range Filter	.25

Minimum Order $2.50 25% Deposit on C.O.D.'s

DAVE RUMPH CO.
P. O. Box 4178
FORT WORTH 6, TEXAS

NOW!
SPEED UP ALL SOLDERING WITH
UNGAR
FEATHER-LIGHT SOLDERING PENCILS WITH
HI-HEAT
INCREASED WATTAGE
TIPS

For use with No 776 Handle & Cord Set

Stop wrestling with *big* irons. New HI-HEAT TIPS in your Ungar Electric Soldering Pencil produce a really versatile tool that'll perform on a par with the big, bulky 100-150 watt irons. If you can't get immediate delivery, please be patient, for production hasn't yet caught up with demand. Ask your supplier for No. 1236 Pyramid or No. 1239 Chisel. List price, $1.25 each.

Ungar
ELECTRIC TOOL CO., Inc.
LOS ANGELES 54, CALIFORNIA

8 WIRE CONTROL CABLE
Two No. 16, Six No. 20 tinned, stranded, copper, rubber insulated coded leads. Waterproof rubber jacket. Woven copper armor shield overall. Wt. 16 lbs./100 ft.
Lengths to 400 ft. LOW PRICE
FOB warehouse. Minimum order 100 ft.
Shipment is made by Railway Express—shipping charges collect.
5c ft.
Trans-World Radio-Television Corp.
6639 S. Aberdeen St. Chicago 21, Ill.
Phone: AUstin 7-4538

RADIO COURSES
- RADIO OPERATING
- CODE
- FM
- RADIO SERVICING
- TELEVISION

Preparation for Civilian, Maritime, Army and Navy license requirements.
Personal Counselling Service for Veterans
Write for Catalog T.C.
YMCA
TRADE & TECH. SCHOOL
229 W. 66 St., N. Y. 23
ENdicott 2-8117

POWER TRANS. 2100VCT/200 ma. 7.5 VCT/4A 2 5V./10A. $6.95
BC733D Superhet Receiver easily converted to 2 MTR. band.
BC429 RCVR. (SCR183) with 1 Dual Range T.U. 200-400Kc / 2500-4700Kc $3.95

Write For Flyers
ARC/5 Xmtrs VFO Drivers 40 Watts Output
3-4 Mc Good Cond. . $6.95
Gibson Girl Xmitr . 3.49
ARR2 Rec as is . . . 4.95
BC 605 Amplifier, New 4.69
Write For Many Others

COMMUNICATIONS EQUIPMENT CO.
131 Liberty St., Dept. Q10 New York 7, N. Y. Digby 9-4124

Tuning for single sideband signals is also similar, except that it is more difficult. Since there is at most a weak carrier to indicate perfect tuning and to lock the local oscillator, tuning must be done slowly. It becomes easier with practice, since the ear becomes accustomed to the difference in distortion with tuning either high or low. When tuning is perfect, the sideband selector should be set to the sideband being transmitted, since this improves the signal-noise ratio, and also reduces the possibility of QRM.

It will be found that this receiver is very intolerant of poor signals. The worst offenders are those which chirp, or which show a carrier shift at syllable frequency. Stations with hum frequency modulation, and with simultaneous amplitude and frequency modulation also show up poorly. The percentage of stations showing one of these troubles is surprisingly high, probably due to poorly stabilized VFOs.

With a good signal the receiver is a pleasure to handle. The payoff comes when QRM starts dropping in. Moderate QRM causes practically no trouble—the sideband selection feature can usually handle it. Even with heavy phone QRM, which requires binaural reception, it is rare that intelligibility is lost completely. This means that a higher percentage of QSOs can be completed satisfactorily, which is the real measure of the worth of a receiver.

BREAKIN

(from page 37)

output to an extra input terminal, terminal *A*. This can go either to the output of an audio filter, or be connected to the regular input of the limiter, to bypass the 10 db insertion loss of the limiter.

The gadget is intended to work from any receiver output which provides enough audio voltage, and into a set of high-impedance earphones. It was built, with room to spare, into a 4×4×2 inch utility box. Most of the wiring can be done right on the switch terminals.

If you have never used a headphone limiter before it will take some experimenting to get the most out of it. Limiting switch S_1 and the volume control R_3 are independent of each other in action. However, increasing the receiver gain and dropping R_3 will effectively increase the amount of limiting. Listen to a c.w. signal and adjust the limiter until you have comfortable headphone volume and the signal is just barely clipped. Now when you press the key, your signal will be limited right down to the value of the other man's signal, and the clicks due to blocking will largely disappear.

In addition to being a good breakin limiter, the gadget has proved itself as excellent to limit impulse noise and fading. Because of its gradual "AVC" action without time lag, the limiter reduces the effects of fading very nicely. For something which took a couple of hours and a few bucks to build, it certainly has paid off on the operating table.

THE CONTEST MACHINE

(from page 30)

of the first CQ. Thus, when the CQ and call sign are completed, and the next run started, only the

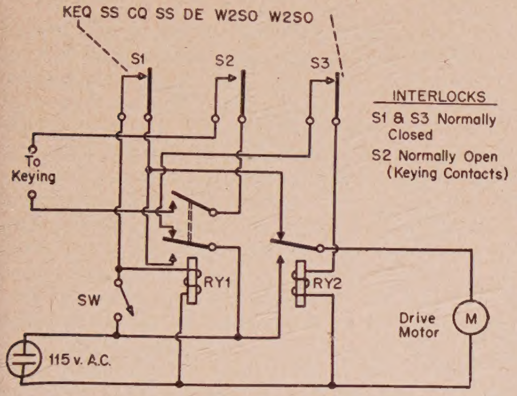


Fig. 4. The keying and interlock circuit.

—·— keys the transmitter. Since it is impossible to stop the disk instantly, only the keying relay circuit is opened and the disk continues to rotate. A second limit switch actually stops the disk in such a position that upon starting again, it will start at the initial CQ instead of somewhere in the middle of the message. *Figure 4* shows the circuit used.

When the "operate" switch *SW* is closed, *relay 1* closes and starts the motor. As long as the switch is closed the motor operates. When *SW* is opened, the motor still runs since *relay 1* is sealed in through its own contact and the normally closed interlock switch S_1. The motor continues until S_1 is opened by the stop screw after —·— of the first CQ. This

(*QSY to page 68*)

Dollars for Watts

W7JVO
DON PETERS
HELPS THE UNITED STATES FOREST SERVICE "KEEP OREGON GREEN"
7588
U.S. FOREST SERVICE

CONCORD-CHICAGO is HQ for HAMS

LYSCO TVI-FREE XMTR

Model 600 TVI-free Transmitter. VFO or crystal controlled band switching. Rated at 35 watts input either CW or phone. Oscillator keying for break-in operation. Covers 160, 80, 40, 20, 15, 11 and 10 meter bands. Separately tuned power amplifier plate circuit. Output circuit 50 ohms impedance. Uses 6AG7 oscillator, 6AG7 buffer-doubler and 807 final amplifier which is mounted in under chassis compartment providing double shielding against spurious and harmonic radiation. Internal power supply uses 5U4G rectifier and VR-150 voltage regulator. Size: 15 x 11 x 9". For 115 volts, 60 cycles AC. Terminals provided for external modulator. With tubes and instructions.

29-21119C--Shpg. Wt. 35 lbs.................. 119.95

LYSCO MINIATURE VFO

Lysco Model 381R Miniature VFO for fixed or mobile operation. Easy-to-read illuminated dial calibrated for 80, 40, 20, and 10 meters with output on 80 or 40 meters. Good stability --series tuned "Colpitts" oscillator. Low impedance 15' coax cable with remote tuned circuit on 80 or 40 meters. Tubes: (3) 6AK5's. Operates on 6.3 volts AC/DC, 1.35 amps, 200 volts DC max. 30 ma. Size: 3 x 4 x 5". Complete with tubes.

29-21121C--Shpg. Wt. 4 lbs...................... 27.95

CONCORD RADIO
Mail Order Center and Showroom
901 W. Jackson Blvd., Chicago 7, Ill.
Branch Showroom: 265 Peachtree St., Atlanta 3, Ga.

HARVEY WELLS 50-WATT PHONE & CW XMTR

Bandmaster Senior. Streamlined version of popular TBS-50. Features radically new crystal oscillator vfo switching circuit. No plug-in coils. Covers 8 bands from 80 to 2 meters at the flick of a switch. Optional crystal control or vfo input. 100% break-in operation. No oscillator or multiplier tuning necessary except to resonate the antenna. For fixed or mobile operation from AC, vibrapack or dynamotor. Use as exciter when increasing output. Tubes: 6AQ5 crystal oscillator, 6AQ5 buffer-multiplier, 807 final amplifier; (2) 6L6 class B modulators. Controls include band switch, excitation, antenna loading, amplifier tuning, power-on, carrier-on, meter switch, and phone-CW switch. Size: 8 x 12 x 8". With tubes. Less power supply.

30-21038C--Shpg. Wt. 20 lbs..................... 111.50

30-21039C--Power Supply for 110 V AC, 50-60 cyc....... 39.50

GONSET TRI-BAND CONVERTER.

Gonset's NEW "Band Spread Mobile Tri-Band Converter" covers all amateur mobile phone bands. Has complete band spread on 10-11, 20, 75 meter phone bands. 28-29.7 mc--8 in. linear dial. 14-4 mc--2-1/4 inch linear dial. 3800-4000 kc--6 in. linear dial. Planetary Gear Drive. Tubes: 6CB6, 6C4, 6AV6, 6BH6. 5 1/4x5 1/4x3 1/2.

29-21113C--Shpg. Wt. 5 lbs.................. 42.50

SNAP-OUT WHIP ANTENNA

Eight tapered sections, 125" fully extended and only 17" collapsed. Powerful spring housed in the base holds brass tubing sections firmly in place with the aid of a braided wire cable extending through the entire length of the antenna. Base has 5/16" long threaded mounting rod.

99-9538C.................................. 1.39

NO SHORTAGES HERE!

RED ARROW SALES has what it advertises. If you don't see what you want listed, please write. We specialize in Ceramicons, Resistors and Condensers.

TRANSMITTING MICAS All sizes from .0001 to .005 MFD—3000 and 5000 volts. BRAND NEW!
SPECIAL PRICE 39¢ each

THERMAL RELAY Type ER. 110 volts, 30 amps. BRAND NEW!
ONLY $1.29 each

TUBE RIOT! All Branded. New in original cartons.

872	$1.29	371	$ .49
10Y	.29	801	.24
24G	.29	1626	.24
615	.29	826	.34

MINIMUM ORDER—$2.00. Send 25% deposit with order, balance C.O.D. Shipped F.O.B., N.Y.C. (N.Y.C. residents add 2% sales tax.)

RED ARROW SALES
DEPT. C, 63 EAST BROADWAY, N. Y. 2
PHONE—COrtland 7-5425

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way—with an **Instructograph Code Teacher.** Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System.** Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

Dept. C, 4701 SHERIDAN ROAD, CHICAGO 40, ILL.

RADIO AMATEUR CALL BOOK

Contains a complete and up to date list of all licensed radio amateurs throughout the world. Also each issue lists radio amateur prefixes, Great Circle Maps, Great Circle Bearing Tables, Prefix Map of the World, Distance Table and other valuable information.

Published quarterly, Spring, Summer, Fall and Winter. Single copies in the U. S. and Possessions $2.00. Elsewhere $2.25. Annual subscription, U. S. and Possessions $6.50. Elsewhere $7.50.

ORDER YOUR COPY TODAY

RADIO AMATEUR CALL BOOK, Inc.
612 SOUTH DEARBORN STREET
CHICAGO 5, ILLINOIS, U.S.A.

opens *relay 1* which opens the keying circuit. The back contacts on *relay 1* close *relay 2* through the normally closed interlock S_3. This allows the motor to keep running, but with no keying. The motor continues until the interlock S_3 opens at the reset position which is the start of the CQ. Throwing the switch starts the sequence again. Note that the machine CQs as long as the switch is closed and signs off as soon as possible after the switch is opened.

In *Fig. 4,* the interlock stops are shown located relative to the code message. Dotted lines connect to the actual interlock. Two types of interlock stops are used in this machine. This is a matter of convenience rather than necessity. The most simple is merely a 6-32 screw and protruding from the disk. The other is a small angle bracket. In order for the two stops to operate only their own interlocks, the stops are located on different circles. Also one interlock switch is mounted further away from the disk than the other. It was first thought necessary to be able to adjust the interlocks for correct timing and it was planned to mount them on plates which could be adjusted using longer clearance holes. In practice, they were omitted. The interlocks themselves are microswitches with the leaf and roller assembly. Any convenient type of relay may be used for the control circuit.

The CQ'er worked right from the start. Now if only I can get a mind-reading machine, and cross breed the two, I can forget the code.

LETTERS

(from page 4)

ference is caused to other services, the FCC wants to know how to *find* the station and advise the operator. To do this, they need to know (1) the location and (2) whether or not the station is capable of operating in motion. It is to the benefit of each amateur to supply the exact information as required by the regulations.

One can only speculate why anyone would choose to publish this type of information when it would have been just as easy to have given the straightforward, unvarnished facts. Such information may not only cause undue difficulty with the FCC for the fellow that follows it, but it also perpetuates the useless inclusion of the call sign area number with the call when phone is employed. Many amateurs feel they have complied with the regulations when they use the form "W1ABC portable 2" (even to the extent of logging this way). When it is required that the *geographical location* of the station be given, of what further value is it anyway, to add the number of the call sign area in which the station is operating?

If you would like an authentic guide for your portable and mobile operating procedure, one that is written in clear and concise language without confusion and certainly uncluttered by any individual personal opinions, it is suggested that you obtain a copy of Part 12 of the FCC Regulations.*

R. V. Anderson, W3NL

---

* 15¢ (no stamps) to Superintendent of Documents, Government Printing Office, Washington, D. C.

MODULATOR

(*from page 35*)

the modulation percentage is proportional to the square root of the power. It might be added in this connection that a speech clipping system to raise the average level of modulation is far more effective than the too often used method of shouting into the mike and splattering all over the band. Our phone bands would be a happier place to live in if more of the gang would realize this fact.

TABLE II

Audio Power required to modulate 1 KW input to final amplifier

Mod. Output	% Modulation
500 watts	100%
400	90%
300	75%
125	50%

Upon completion of the writer's modulator, everything seemed to work as hoped for. It is quite important aside from legal requirements, to carefully monitor modulation with this system since considerably greater driving voltage then necessary is available and exceeding the driving voltages shown in *Table 1* will result in a sharp rise in distortion.

Adjustment

The only adjustment required was to remove th 6SN7 voice control tube and set the 304TH bia at the correct operating point (refer to *Table 1*) Then the voice control tube was reinserted in it socket and the no-speech bias on the 304TH varie until the plate current is almost zero. As soon a speech begins, the speech control tube will cut of thus removing the extra negative bias and th modulator plate current will be normal. It wa found worthwhile to provide a potentiometer fo adjustment of the voice control time constant s that the turn-off time can be varied to suit individual requirements. As a further refinement of th system, the writer is presently including a speec clipper and negative feedback arrangement to reduc the distortion inherent in the system and to rais the average level of modulation. It is felt that suc innovations, although they add to the complexit of the circuit, certainly cost little enough and ad tremendously to the performance of this system o any other modulator.

While the above circuit does not represent th ultimate in high-level modulator design, and ha certain shortcomings, it *does* enable one to provid adequate modulation for the average 1-kw c.w transmitter with very little cost. The writer wa thus able to convert his 1-kw c.w. transmitter int a 900-watt well-modulated AM phone at the cos of less than twelve dollars. Reports on the ai indicate performance that is completely satisfactory

CQ, the amateur's, experimenter's, technician's publication. For beginner and old-timer! Subscribe now and be sure of getting each issue chockful of intelligent, constructive articles edited for YOU. Subscribe now—Save $1.20 per year.—You can't go wrong!

One Year. . . . $3.00 Two Years. . . . $5.00

in U.S., U.S. Possessions, Canada and countries in the Pan American union. All others $4.00 per year.

CQ MAGAZINE

342 MADISON AVE., NEW YORK 17, N. Y.

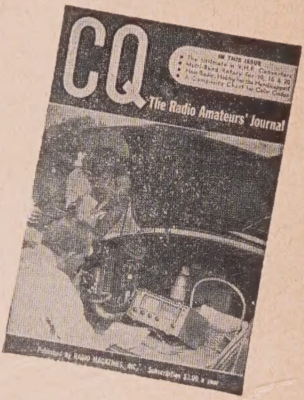
Enclosed find $. . . . . for a . . . . year subscription

to be sent to: ☐ New ☐ Renewal

Name . . . . Call . . . .

Address . . . .

City . . . . Zone . . . . . State . . . .



Classified Ads

Advertising in this section must pertain to amateur radio activities. Rates: 25c per word per insertion for commercial advertisements. 5c per word for non-commercial advertisements by bona fide amateurs. Remittance in full must accompany copy. Phone orders not accepted. No agency or term or cash discounts allowed. No display or special typographical ad setups allowed. "CQ" does not guarantee any product or service advertised in the Classified Section. Closing date for ads is the 25th of the 2nd month preceding publication date.

PERSONAL service backed by 25 years amateur experience is available when you trade with W1BFT, Evans Radio, Concord, N. H.

10 AND 20 METER BEAMS $19.25 up. Aluminum tubing, etc. Willard Radcliff, Fostoria, Ohio.

HQ129X RECEIVER. SPEAKER, excellent, $125. Hunter Cyclemaster like new, $125. 250 watt xmtr, pr T40 modulated by pr 807's in gray cabinet, beautifully constructed, surpasses most commercial equipment. Write for details. W9DSV, Box 261, Webster, Wisc.

WANT HRO-7. M. G. Morgan, W1HDA, Hanover, N. H.

SELL: RME-43 with calibrated bandspread, $50. VHF-152A, $55. Millen model 90800 transmitter with tubes and coils for all bands, best offer over $22. Subraco MT-15X, $65. New PR type Z-3 crystals from 14251 kc to 14660 kc, $2 each. 100 kc crystals, $3. Two new 814's, $3 each. NBFM exciter, $7. Robert Rosenquist, 2558 Ida Street, Omaha, Nebraska.

CHANGES OF ADDRESS require 5 weeks time before stencils can be corrected. Please give old address, new address and code line on magazine wrapper when advising CQ Magazine of your new residence.

WANTED: A few TR-4s. State condition, price, etc. W1BB.

WANTED: APR-4 receiver, 1250 mc. Selling 3 new RCA 8012's $2.00. 2 early BC221 double coil assemblies, $2.00. W1JW, Box 166, Long Hill, Conn.

FOR SALE: NC-57 in excellent condition, $70.00. Brand new R9'er with two tubes and two coils, $18.00; 25 watt c.w. xmitter for 80, 40, and 20 meters, $15. W4MXT.

SPECIALIZED QSLs, SWLs! Samples! W0QFZ, 2705 So. 7th, Council Bluffs 3, Iowa.

SELL: Commercially built power supply. Two power supplies in one neat unit, consisting of: 20 v.d.c. bias 6.3 v.a.c. 3.5 amps, 10 v.a.c. 5 amps, 250 v.d.c. 60 ma., 360 v.d.c. 60 ma. 150 v.d.c. 10 ma. (regulated), 1350 v.d.c. 200 ma. Input, 105-115-125 v.a.c. 60 cycles—400 watts. Complete with power cables, instructions and full complement of tubes (1—VR-150; 1—83; 2—866s) $35.00. F.O.B. Apt. 4, Bldg. 539, Fort Monmouth, N. J. W2ECQ.

FOR SALE: 32V1—$395. postpaid. Frank Finch, 812 West 4th. Port Angeles, Wash. W7HXP.

FOR SALE: Federal Telephone and Telegraph BC1147 receiver, rack mounting, 13 tubes including rectifier, VR, 60c., 110v., speaker, variable selectivity, BFO, 1.5 to 30.0 Mc., hot on ten, $59; Western Electric marine transmitter-receiver TRC109C, complete, tubes, crystals, handset, power supply, speaker, 2 to 3.5 Mc., brand new, $65; SX28, clean, top condition, $105; New PE103. spares, $20; Plate transformer, 1750, 2000 VDC, 300 Ma, $20; FOB Al Schwaneke, W0TPK, Route 5. Warrensburg, Mo.

FOR SALE: Limited quantity OQ-2A twelve-foot target planes—$98 50 and up. Karl Ort, Dept P. York, Penna.

WANTED: APR-4 receiver and tuning units. State condition and price. W2DB, 274 Boulevard, Scarsdale, N. Y.

QSLs? SWLs? Made-to-order! Samples 3¢. Sackers, W8DED, Holland, Mich.

TO COMPLETE PERSONAL FILE, premium prices will be paid for January, March, May, June and December 1945 issues of CQ if in excellent condition W0IJN.

SELL: Old catalogs, old QSTs, Electrical Experimenters, Wireless Age. Want: Marconi 106-112 tuners, magnetic detector, wireless specialty apparatus, Electro Importing Co. apparatus, old wireless books. L. Rizoli, W1AAT, 100 Bay View, Salem, Mass

QSL-SWL cards. Samples. W1HJI, Box 32B, Manchester, N. H.

SELL original Army Technical Manual on SCR211 (BC221) frequency meter—complete detailed specs., schematics, trouble-shooting instructions—all models. 162 pages, $2.00. U. S. Navy Synchros—complete instructions on operation, maintenance, and trouble-shooting of Selsyns—very rare. 166 pages $1.50. BC453A and SCR522A schematic wiring diagram, 25¢ each. Frank Dunan, W3NB, 1717 Lang Place, NE., Washington 2, D. C

QSLs, HIGH QUALITY, fair prices. Samples? W7GPP, 1380 E. The Dalles, Oregon.

HOTTEST SURPLUS LIST in the country. Electronics—hydraulics—aircraft gadgets. Dick Rose, Everett, Wash.

10-METER 3-ELEMENT BEAMS—$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

QSLs! TAPRINT, Sumrall, Mississippi.

BARGAINS—NEW AND USED TRANSMITTERS—RECEIVERS—PARTS: BC-610 $450.00; Globe King $299.00; HT-9 $225.00; Temco 75GA $250.00; Sonar SRT-75 $129.00; ART 13 $119.00; Collins 75A1 $295.00; new 150 watt phone $199.00; HT-6 $85.00; Meck T-60 $85.00; Globe Trotter $57.50; New Bud VFO $39.50; New Meissner Signal Calibrators $29.95; HRO complete $129.00; SX43 $129.00; NC173, HQ129X $139.00; RME45 $99.00; SX42 $189.00; SX25 $89.00; RME69 $69.50; VHF152A $69.00; S-38 $29.95; and many others. LARGE STOCK TRADE-INS. Free trial. Terms financed by Leo, W0GFQ. Write for catalog and best deal to World Radio Labs., Council Bluffs, Iowa.

QSLs. SWLs. Made the way you want them. Samples? W9BHV QSL Factory, 855 Burlington Ave., Frankfort, Ind.

SELL used RCA ACT 20 watt c.w.-phone transmitter, complete tubes, crystals, $35.00. Cost $129.50. Curtis, KFRO, Longview, Texas.

WANT communications receivers. Pay cash or will make big allowances on new receivers. Have bargains in large stock of new and reconditioned Collins, National, Hammarlund, RME, Millen, Meissner, other equipment. Shipped on trial. We finance terms. Write for free list. Henry Radio, Butler, Missouri.

BC-348 WANTED. Any series except J, N, or Q. Must be in new condition, both electrically and mechanically. Will pay cash, or have good transmitting and receiving equipment for trade. What will you take for it? Write Box 10, c/o CQ Magazine, 342 Madison Avenue, New York 17, N. Y.

SELLING OUT: Class B TZ40's modulator for above with power supply. Includes Thordarson 300 watt multimatch modulation transformer, $55. DB20 $29. 40 watt fone xmtr., $35. Hallicrafters T505 7" TV set, $60. W0ZHJ, 3119 Que St., Lincoln, Nebraska.

WANTED: BC-610 tuning units TU-47, 48, 50, 53. H. W. Dickow, 1387 40 Ave., San Francisco, Calif.

FOR SALE: BC-604 with dyn. and xtals, $18. New BC-603 recvr $10. M. Haase, Fergus Falls, Minn.

SALE: Handie Talkie, pair, $6. 27-142 mc. receiver, $65. 20 watt mod. transf. $1. W2OTI, D. Vettese, Pomona, N. J.

FORCED SALE: 220 watt CW/FM transmitter, ARC5 VFO, Sonar XE10, fully metered, shielded rack and panel. First $85 takes the works. Herbert Spingeld, W2QNW, 35-50 78th St., Jackson Heights, N. Y. RH 4-9144.

FOR SALE: Instructograph with built-in AC-DC oscillator, six tapes, $12.00. Also little-used VM-4 modulation transformer, pair of 805's, input and filament transformers for 805's, and a few H.V. power supply components. W5OXD, 723 Fredonia, Muskogee, Okla.

WANTED: AN/APR-4 receivers and tuning units; UHF signal generator; laboratory quality test equipment, dial telephones, steeping switches, Motorola program clocks and tuners; surplus, APR-5A, TS-174/U, TS-175U, ARR-5, ARR-7, ART-13, etc. Cash or trade. Describe and price in first letter. Littell, Farhills Box 26, Dayton 9, Ohio.

SPECIAL
BC610 CHOKES
11 Henry .600 Amp.
Herm. Sealed.
$7.95

Atronic Corp.
Dept. C-10
1253 Loyola Ave.,
Chicago 26, Ill.

10 METER BEAM ANTENNA

$15.95
3 ELEMENTS
SPECIAL

Volt-Ohm-Milliameter 0-1 MA. 4" Fan Type. Diagram Incl. Makes 1000 ohm per volt unit. **Meter Only $2.95**

GOLD PLATED CRYSTALS

2 FOR $1.00 POSTPAID IN THE U.S.A.

All fundamental freqs. in Kilocycles

5910
6350
6370
6470
6510
6610
6670
6940
6690
7270
7350
7380
7390
7480
7580
9720

GUARANTEED

ELECTRONICRAFT, Inc. 5 Waverly Place Tuckahoe 7 N. Y.